

WE CLAIM:

sub
a1
1. A genetic construct comprising a gene operatively-linked to a carrier, wherein the carrier is associated with a transmembrane form of viral glycoprotein or derivative thereof.

5 2. The genetic construct of Claim 1, wherein the transmembrane form of viral glycoprotein or derivative thereof is expressed on the surface of the carrier.

a
3. The genetic construct of Claim 1, wherein the transmembrane form of viral glycoprotein or derivative thereof is from Ebola.

4. The genetic construct of Claim 1, wherein the carrier is a viral vector.

10 5. The genetic construct of Claim 1, wherein the carrier is a non-biologic gene targeting vehicle.

6. The genetic construct of Claim 4, wherein the viral vector is a retroviral vector.

15 7. The genetic construct of Claim 4, wherein the viral vector is a lentiviral vector.

8. The genetic construct of Claim 5, wherein the non-biologic gene targeting vehicle is a liposome.

9. The genetic construct of Claim 5, wherein the non-biologic gene targeting vehicle is a DNA-protein complex.

20 sub a2
10. A method of targeting a gene to a cell comprising the step of administering to a cell population a genetic construct comprising the gene operatively-linked to a carrier, wherein the carrier is associated with a transmembrane form of viral glycoprotein or derivatives thereof.

25 11. The method of Claim 10, wherein the transmembrane form of viral glycoprotein or derivative thereof is expressed on the surface of the carrier.

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12. The method of Claim 10, wherein the transmembrane form of viral glycoprotein or derivative thereof is from Ebola.

13. The method of Claim 10, wherein the carrier is a viral vector.

14. The method of Claim 10, wherein the step of administration is *ex vivo*.

5 15. The method of Claim 10, wherein the step of administration is *in vivo*.

16. The method of Claim 10, wherein the cell is an endothelial cell. ✓

17. The method of Claim 10, wherein the cell is a hepatocyte. ✓

18. The method of Claim 10, wherein the cell is a monocyte. ✓

19. The method of Claim 10, wherein the cell is a dendritic cell.

10 20. The method of Claim 14, further comprising the step of introducing the cell population to a subject.

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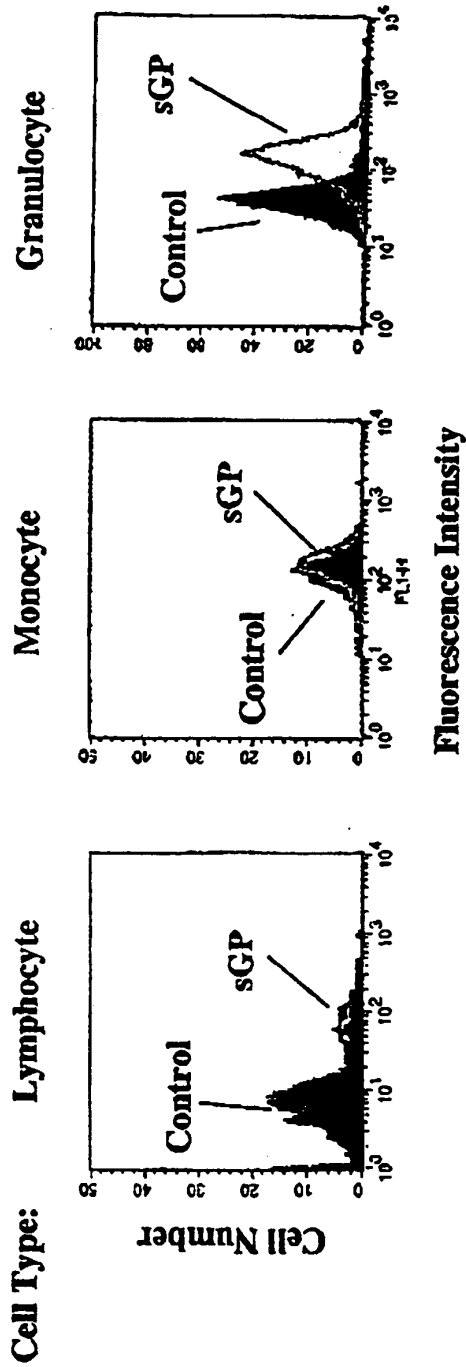


Figure 1A

Figure 1A1

Figure 1A2

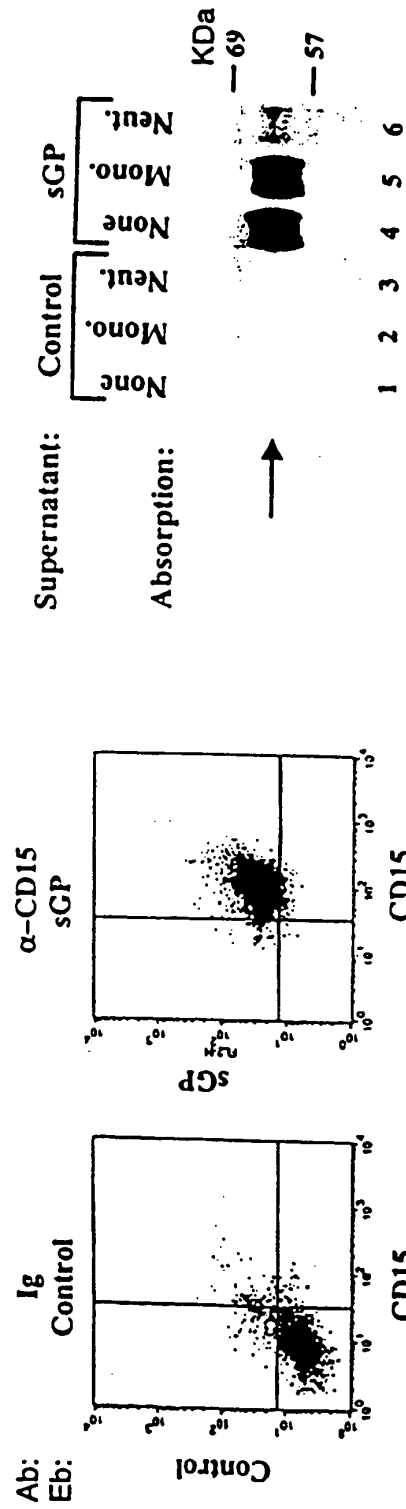


Figure 1B

Figure 1B1

Figure 1C

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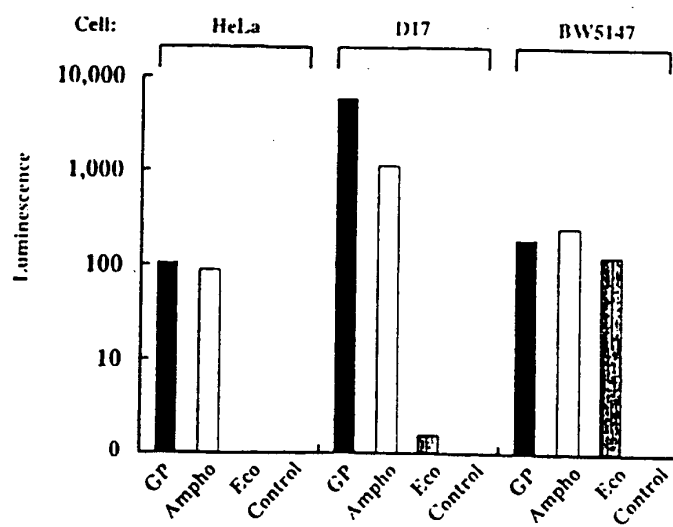


Figure 2A

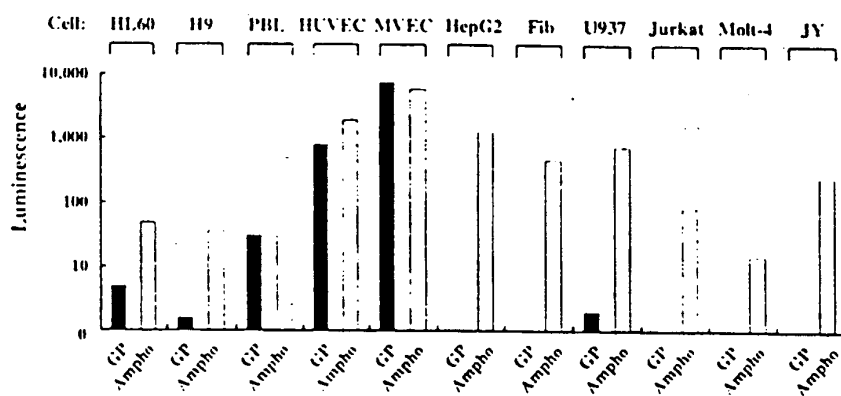


Figure 2B

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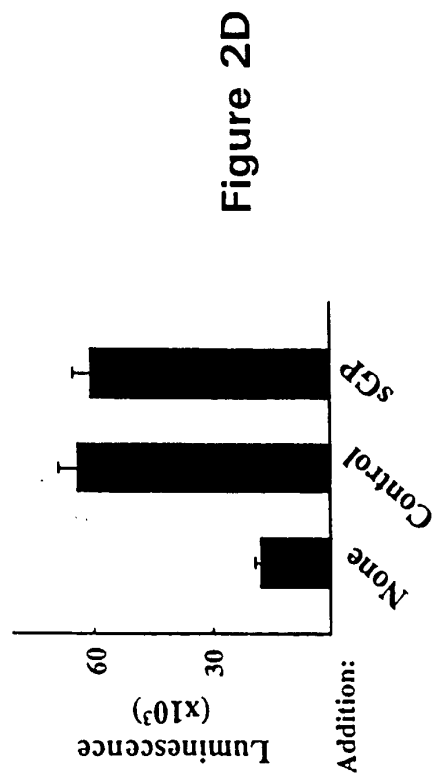
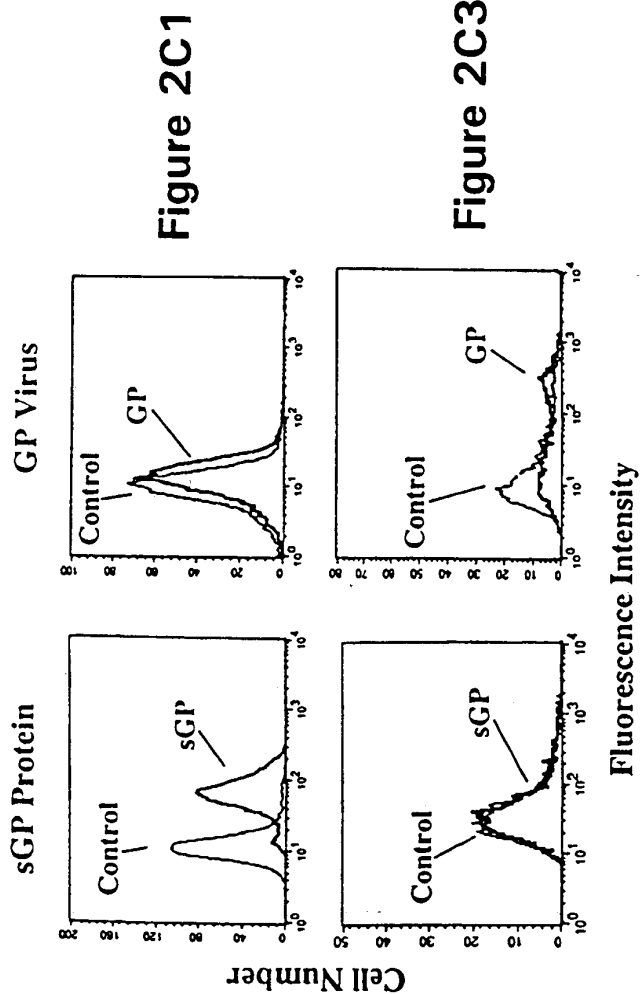


Figure 3A

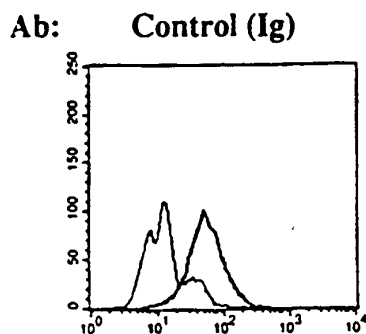


Figure 3B

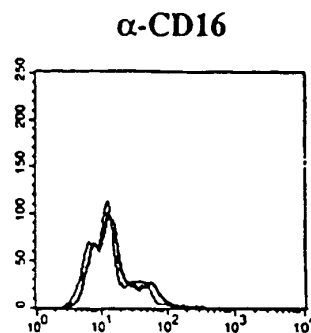


Figure 3C

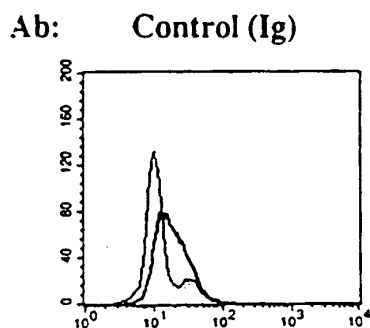


Figure 3D

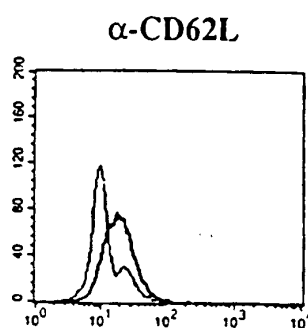


Figure 3E

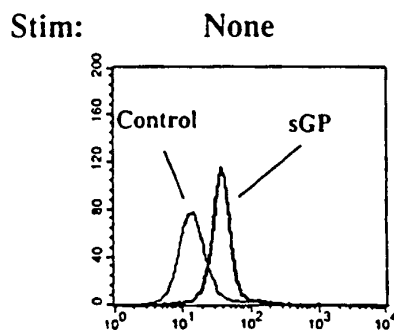
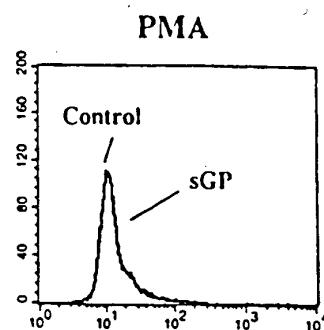


Figure 3F



Fluorescence Intensity

Cell Number

096007EE-05401
F04T50-99/00960

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Figure 4A

Pre-stimulation

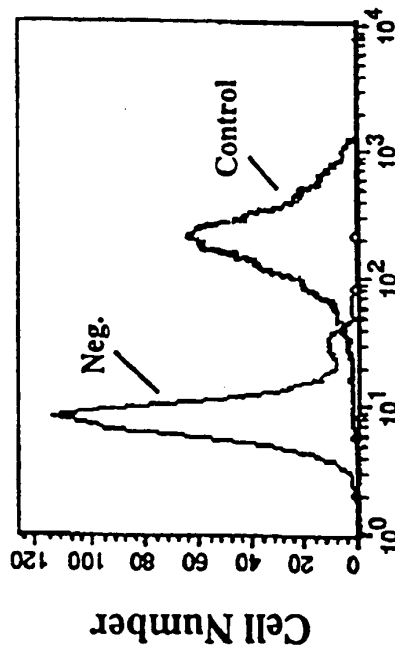
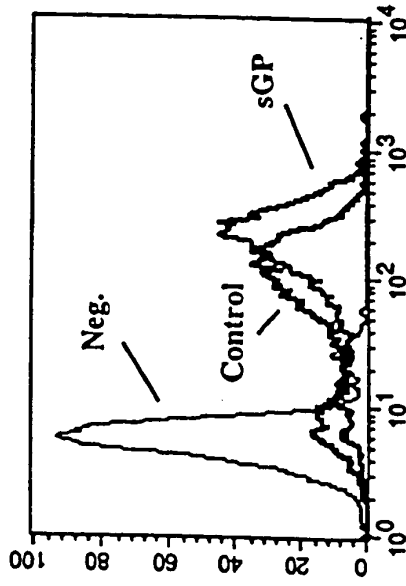


Figure 4B

Post-stimulation



Fluorescence Intensity

Figure 5A

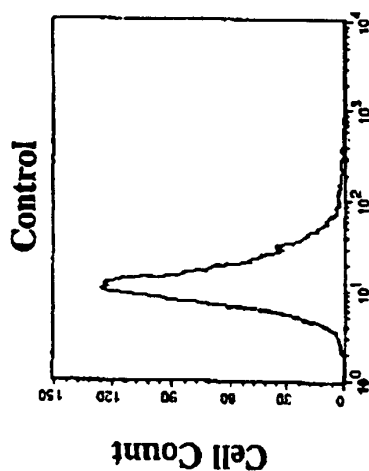


Figure 5B

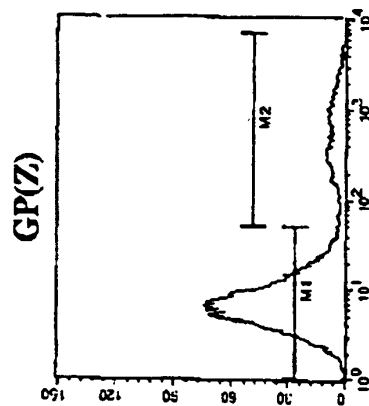
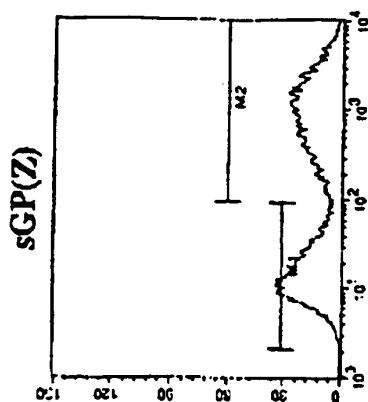


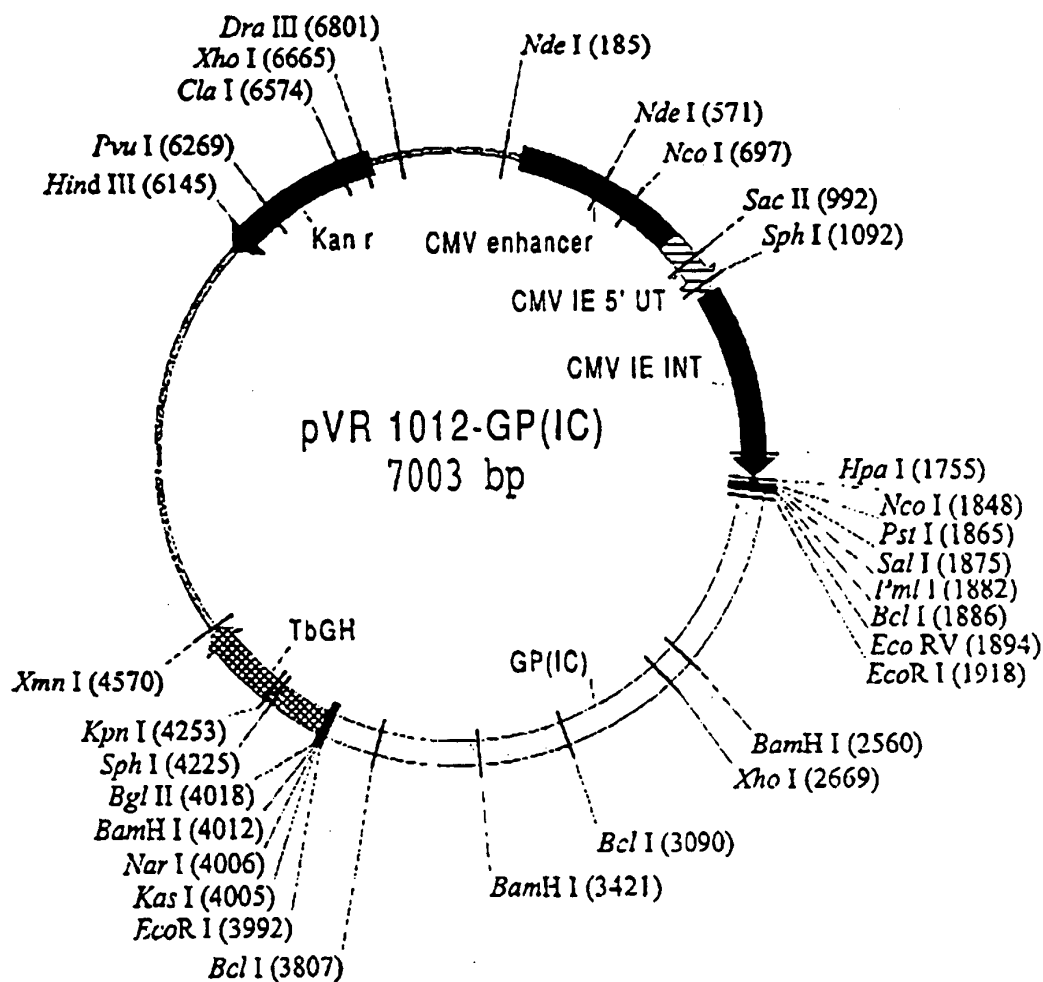
Figure 5C



Fluorescence Intensity

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**Figure 6**

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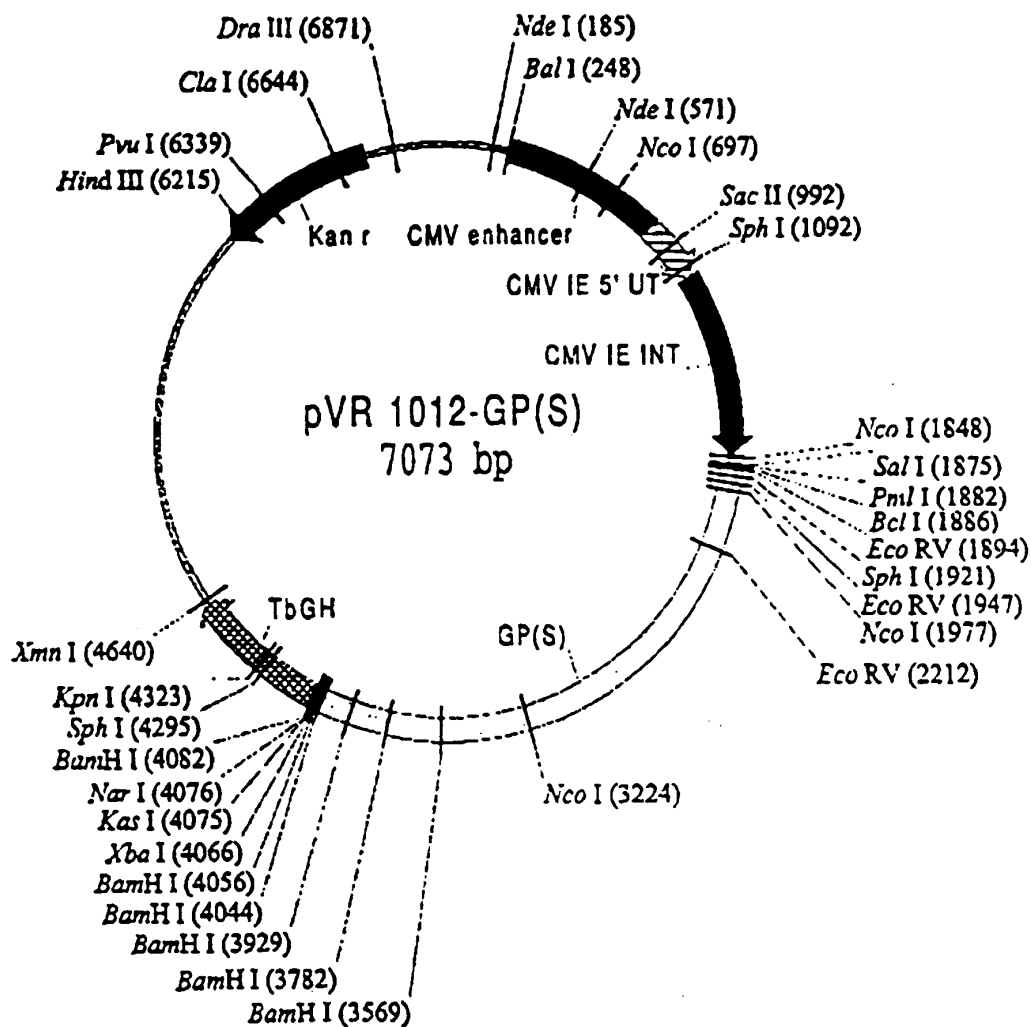


Figure 7

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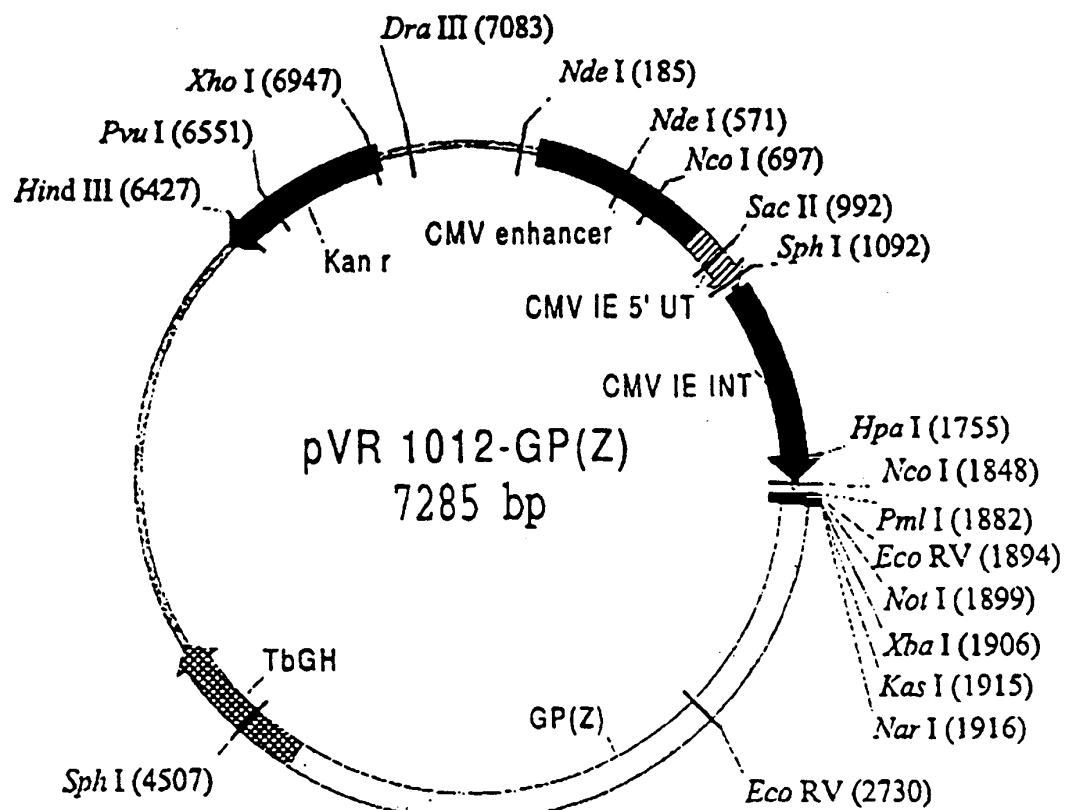


Figure 8

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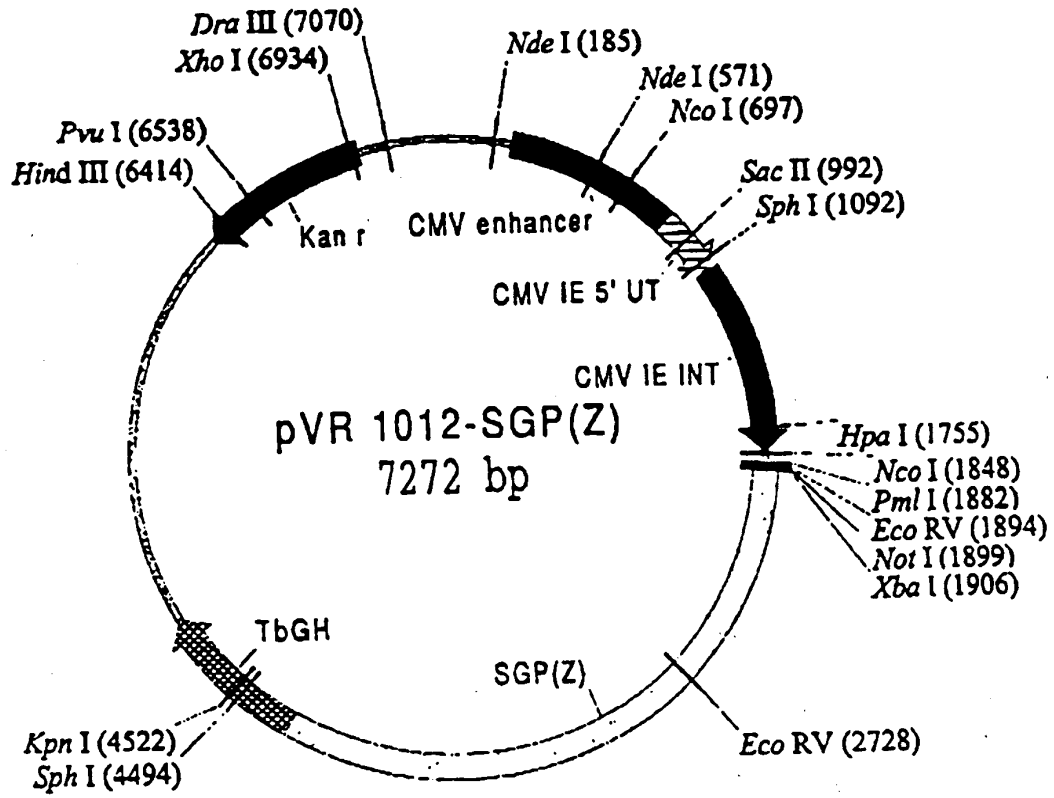


Figure 9

104150-99200960

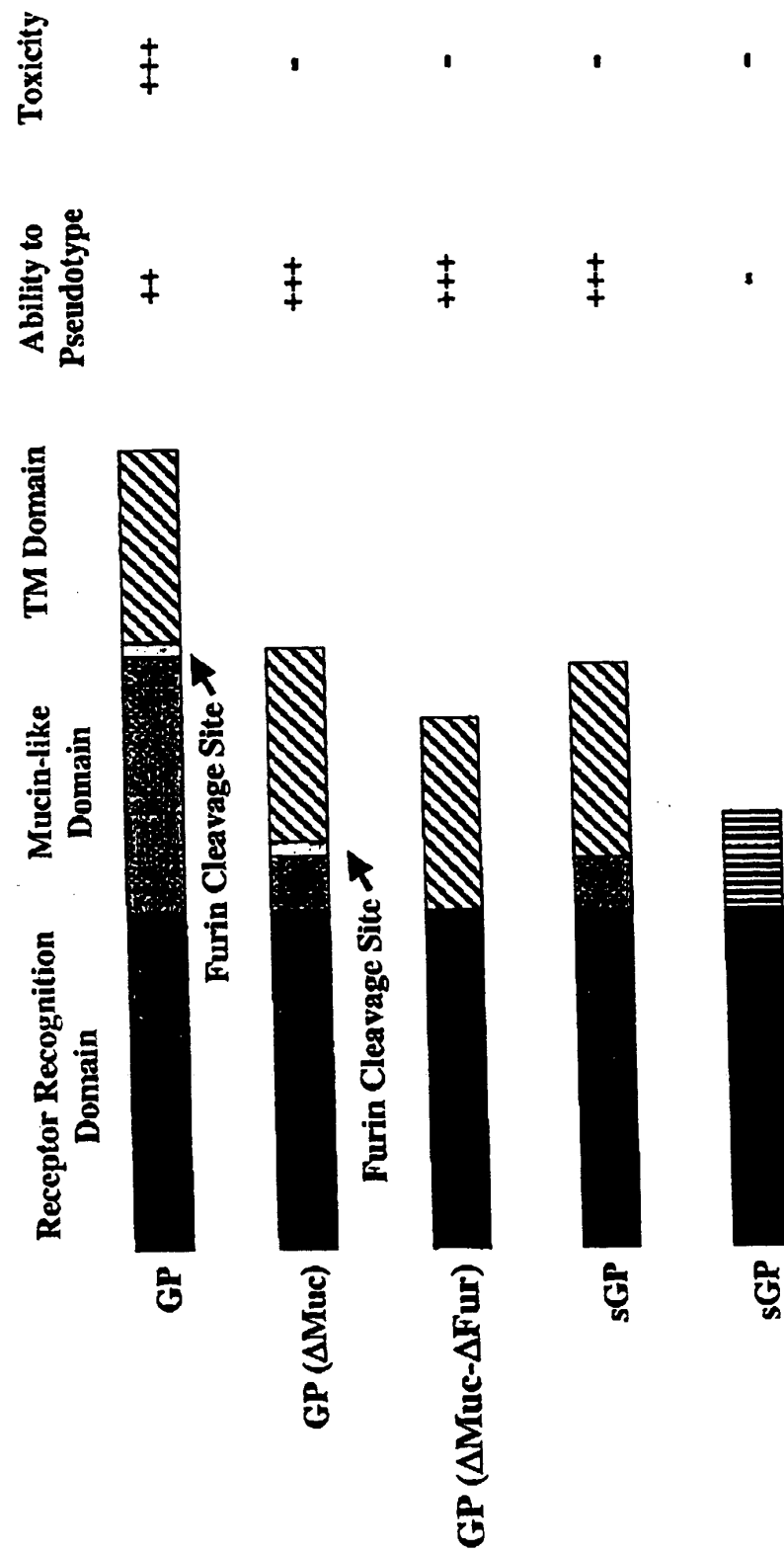


Figure 10

SEQUENCE LISTING ID NO: 1

pvr 1012-GP(IC)

General Description

DNA pvr 1012-GP(IC)
 Local object
 Created: 09/14/98 04:17PM
 Last Modification Date: ? (no data)
 length: 7003 bp
 storage type: Basic
 form: Circular

Comments

Restriction Map

BglII: 1 site AGATCT
 TCTAGA
 ClaI: 1 site ATTCAT
 TAGCTA
 DraIII: 1 site CACNNNGTC
 GTGNNNCAC
 EcoRV: 1 site GATATC
 CTATAG
 HindIII: 1 site AAGCTT
 TTCCAA
 HpaI: 1 site GTTAAC
 CAATTG
 KsaI: 1 site GGCGCC
 CCGCGG
 KpnI: 1 site GGTACC
 CCATGG
 NarI: 1 site GGCGCC
 CCGCGG
 PmlI: 1 site CACGTG
 GTGCAC
 PstI: 1 site CTCGAG
 GAGCTC
 PvuI: 1 site CGATCG
 GCTAGC
 SacII: 1 site CCGCGG
 GCGGCC
 SalI: 1 site GTCGAC
 CAGCTG
 XmnI: 1 site GAANNNTTC
 CTTNNNAAG
 EcoRI: 2 sites GAATTC
 CTTAAG
 NcoI: 2 sites CCATGG
 GGTACC
 NdeI: 2 sites CATATG
 GTATAC
 SphI: 2 sites GCATGC
 CGTACG
 XhoI: 2 sites CTCGAG
 GAGCTC
 BamHI: 3 sites CGATCC
 CCTAGG

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BclI: 3 sites TCATCA
 ACTAGT

Functional Map

CDS (4 signals)

CMV IE 5' UT

Start: 886 End: 1129

CMV IE INT

Start: 1130 End: 1840

TbGH

Start: 4020 End: 4572

Kan^r

Start: 6068 End: 6690 (Complementary)

Misc_feature (2 signals)

CMV enhancer

Start: 248 End: 885

GP(IC)

Start: 1870 End: 4019

Annotations

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TbGH

1 TCCTCGCTTT CGGTGATGAC GGTGAAAACC TCTGACACAT GCAGCTCCCG
AGCGCGCAAA GCCACTACTG CCACITTTGG AGACTGTGTA CGTCGAGGGC

51 GAGACGOTCA CAGCTTGTCT GTAAGCGGAT GCCGGGAGCA GACAAACCCG
CTCTGCCAGT GTCGAACAGA CATTCCOCTA CGGCCCTCGT CTGTTCCGGC

101 TCAGGCGCGC TCAGCGGGTG TTGGCGGGTG TCGGGGCTGG CTTAACTATG
AGTCCCGCGC AGTCGCCAC AACCGCCAC AGCCCGGACC GAATTGATAC

NdeI

151 CGGCATCAGA GCAGATTCTA CTGAGAGTCC ACCATATCCG GTGTCAAATA
GCCGTAGTCT CTCTTAACAT GACTCTCAGG TGGTATACCG CACACTTTAT

201 CCGCACAGAT CGCTAAGGAG AAAATACCGC ATCAGATTGG CTATTGGCCA
GGCGTGCTTA CGCATTCTC TTTTATGGCG TAGTCTAACC GATAACCGGT

251 TTGCAZACGT TGTATCCATA TCATAATATG TACATTTATA TTGGCTCATG
AACGTATGCA ACATAGGTAT AGTATTATAC ATGTAAATAT AACCGAGTAC

301 TCCACATTA CCGCCATGTT GACATTGATT ATTGACTAGT TATTAATAGT
AGGTTGTAAT GCGGGTACAA CTGTAACATA TAAGTATCA ATAAATTATCA

351 AATCAATTAC GGGGTCATTA GTTCATAGCC CATATATGGA GTTCCGCGTT
TTAGTTAATG CCCCAGTAAT CAAGTATCGG GTATATACCT CAAGGCCAA

401 ACATAACTTA CGGTAATGG CCGGCTGGC TGACCGCCCA ACGACCCCG
TGTATTGAAT GCCATTAC GGGCGGACC ACTGGCGGGT TGCTGGCGGC

451 CCCATTGACC TCAATAATGA CGTATGTTCC CATAGTAACG CCAATAGGGA
GGGTAAGTCC AGTTATTACT GCATACAAGG GTATCATTCG GGTATCCCT

501 CTTTCCATTG ACGTCAATGG GTGGAGTATT TACGGTAAAC TGCCCACTGG
GAAAGGTAA TCAGATTACC CACCTCATAA ATGCCATTG ACGGGTGAAC

NdeI

551 GCAGTACATC AAGTGATCA TATGCCAAGT ACGCCCCCTA TTGACGTCAA
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NcoI

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NcoI

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751 ACGGCGATTT CCAAGTCTCC ACCCCATTGA CGTCAATGGG AGTTTGTTTT
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801 GGCACCAAAA TCAACGGGAC TTTCCAAAAT GTCGTAACAA CTCGGCCCA
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0314031 09200950

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AACTGCGGTTT ACCCGCCATC CGCACATGCC ACCCTCCAGA TATATTCGTC

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SacII

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SphI

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1151 TATAGCTTAG CCTATAGGTG TGGTTATTG ACCATTATTG ACCACTCCCG
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1201 TATTGGTGAC CACTCTTTC ATTACTAATC CATAACATGG CTCTTTGCCA
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RpaI

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NcoI

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SaII

	<u>NcoI</u>	<u>PstI</u>	<u>PmlI</u>	<u>BclI</u>	<u>EcoRV</u>
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EcoRI

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XhoI

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BclI

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BamHI

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.....
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.....

BclI

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.....
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.....
3901 GAAATAGGAAT CACAGGAGTA ATCATTGCTA TTATTGCTTT GCTGTGCATT
CTTATCCTTA GTGTCTCAT TAGTAACGAT AATAACGAAA CGACACGTAA
.....

EcoRI

3951 TGCAAAATCA TGCTTTGAAC TAATATAGCA TCATACTTTA GAATTCCTAG
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.....

NarIKasIBamHI BglII

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.....
4051 TTGTTTGCCC CTCCCCCGTG CCTTCCTTGA CCTGGGAAGG TGCCACTCCC
AACAAACGGG GAGGGGGCAC GGAACGAAC GGGACCTTCC ACCGTGAGGG
.....
4101 ACTGTCTCTT CCTAATAAAA TGAGGAAAT GCATCCGATT GTCTGAGTAG
TCACAGGAAA GGATTATTT ACTCCTTTAA CGTAGCGTAA CAGACTCATC
.....
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CACAGTAAGA TAAGACCCCC CACCCACCC CGTCGTGTCG TTCCCCCTCC
.....

[illegible]

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 CCTCGGTGAC CATGTGCTTA ATCGTCTCGC TCCATACATC CGCCACGATG

 5151 AGACTTCTTG AACTGGTGGC CTAACACGG CTACACTAGA AGGACAGTAT
 TCTCAAGAAC TTCACCACCG GATTGATGCC CATGTGATCT TCCTGTCATA

 5201 TTGGTATCTG CGCTCTGCTG AAGCCAGTTA CCTTCGGAAA AAGACTTGOT
 AACCATAGAC GCGACACGAC TTCGGTCAAT GGAAGCCTTT TTCTCAACCA

 5251 AGCTCTTGAT CCGGCAAAACA AACCAACCGT GGTAGCGGTG GTTTTTTTGT
 TCGAAGACTA GCGCGTTGT TTGGTGGCGA CCATCGCCAC CAAAAAACA

 5301 TTCCAGCAG CAGATTACGC GCAGAAAAA AGGATCTCAA GAAGATCCTT
 AACGTTCTGC GTCTAATCGG CGTCTTTTT TCCTAGAGTT CTCTAGGAA

 5351 TCACTTTTTC TACGGGGTCT GACGCTCAGT GGAACGAAA CTCACGTAA
 ACTAGAAAAC ATGCCCCAGA CTGCGAGTCA CCTTGCTTTT GAGTGCAAT

 5401 GGGATTTTGG TCATCAGATT ATCAAAAAGC ATCTTCACCT AGATCCTTTT
 CCTTAAACC AGTACTCTAA TAGTTTTTCC TAGAAGTGA TCTAGGAAA

 5451 AAATTAATAA TGAAGTTTAA AATCAATCTA AAGTATATAT GAGTAAACTT
 TTAAATTTT ACTTCAAAAT TTAGTTAGAT TTCATATATA CTCATTGAA

 5501 GGTCTGACAC TTACCAATGC TTAATCAGTG AGGCACCTAT CTCAGCGATC
 CCAGACTCTC AATGGTTACG AATTAGTCAC TCCGTGGATA GACTCGCTAG

 5551 TGCCTATTTT GTTCATCCAT AGTTGCTGA CTCCGGGGGG GGGGGCCGCT
 ACAGATAAAG CAAGTAGGTA TCAACGGACT GAGGCCCCCC CCCCCCGGA

 5601 GAGGTCTGCC TCGTGAAGAA GGTGTTGCTG ACTCATACCA GCGCTGAATC
 CTCAGACCGG ACCACTTCTT CCACAACGAC TGAGTATGGT CCGGACTTAG

 5651 GCGCCATCAT CCAGCCAGAA AGTGAGGAG CCACCGTTGA TGAGAGCTTT
 CGGGGTAGTA GGTGCGTCTT TCACTCCCTC GGTGCCAAT ACTCTCGAAA

 5701 GTTGTACGTG GACCAGTTGG TGATTTTGAA CTTTGTCTTT GCCACGGAAC
 CAACATCCAC CTGGTCAACC ACTAAAATT GAAACGAAA CGGTGCTTG

 5751 GGTCTCCGTT GTCGGGAAGA TCGGTGATCT GATCCCTCAA CTCAGCAAAA
 CCAGACGCAA CAGCCCTTCT ACGCACTAGA CTAGGAAGTT GAGTCGTTTT

 5801 GTTCGATTTA TTCAACAAAG CCGCCGTCCC CTCAGTCAG CGTAAAGCTC
 CAACCTAAT AAGTTGTTTC GCGCCAGGG CAGTTCAGTC GCATTACGAG

 5851 TGCCAGTGT ACAAACAATT AACCAATTCT CATTAGAAAA ACTCATCCAG
 ACGGTCACAA TGTTCGTTAA TTGGTTAAGA CTAATCTTT TGAGTAGCTC

 5901 CATCAATGA AACTGCAATT TATTCATATC AGGATTATCA ATACCATATT
 GTAGTTTACT TTGACGTAA ATAAGTATAG TCCTAATAGT TATGCTATAA

 5951 TTTGAAAAAG CCGTTTCTGT AATGAAGGAG AAAACTCACC GAGGCAGTTC
 AAACCTTTTC GGCAGAGACA TTACTTCTC TTTTGAGTGG CTCGCTCAAG

6051 ATCAATACAA CCTATTAATT TCCCCTCGTC AAAATAAGG TTATCAAGTC
TAGTTATGTT GGATAATTAA AGGGGAGCAG TTTTATTCC AATAGTTTAC

6101 AGAATCACC ATGAGTGACG ACTCAATCCG GTGAGATCG CAAAGCTTA
TCTTAAGTGG TACTCACTGC TGACTTAGCC CACTCTTACC GTTTTCGAAT

6151 TCGATTTCCTT TCCAGACTTG TTCAACAGGC CAGOCATTAC GCTCGTCATC
ACCTAAGAA AGGTCTCAAC AAGTTGTCCG GTCCGTAATG CGAGCAGTAG

6201 AAATCACTC GCATCAACCA AACCGTTATT CATTGGTGAT TGCGCCTGAG
TTTAACTGAG CGTAGTTGGT TTGGCAATAA GTAAGCACTA ACCGGGACTC

6251 CCAGACGAAA TACGCGATCG CTGTTAAAG GACAATTACA AACAGGAATC
GCTCTGCTTT ATGCGCTAGC GACAATTTTC CTGTTAATGT TTGTCCTTAG

6301 GAATGCAACC GCGCGAGGAA CACTGCCAGC GCATCAACAA TATTTTCACC
CTTACCTTGG CCGCGTCTCT GTGACGGTGG CGTAGTTGTT ATAAAAGTGG

6351 TGRATCAGGA TATTCTTCTA ATACCTGGA TGCTGTTTC CCGGGGATCG
ACTTAGTCCT ATAAGAAGAT TATGGACCTT ACGACAAAG GGCCCTAGC

6401 CACGGGTGAG TAACCATGCA TCATCAGGAG TACGGATAAA ATGCTTGATG
GTACCAACTC ATTGGTACGT AGTAGTCCTC ATGCCTATTT TACGAACAC

6451 GTCCGAAGAG GCATAAATTC CGTCAGCCAG TTTAGTCTGA CCAATCTCATC
CAGCCCTCTC CGTAATTAAAG GCAGTCGGTC AAATCAGACT GGTAGAGTAG

6501 TGTAACTCA TTGGCAACGC TACCTTTGCC ATGTTTCAGA AACAACTCTG
ACATTCTAGT AACCGTTGCG ATGGAACCGG TACAAAGTCT TTGTTGAGAC

6551 GCGCATCGGG CTTCGCATAC AATCGATAGA TTGTCCGACC TGATTGCCCG
CCCGTAGCCC GAAGGGTATC TTAGCTATCT AACAGCGTGG ACTAACGGGC

6601 ACATTATCGC GAGCCCATTT ATACCCATAT AAATCAGCAT CCATGTTGGA
TGTAAAGCG CTCGGGTAAA TATCGGTATA TTTAGTCGTA GGTACAACT

6651 ATTTAATCGC GGCCTCGAGC AAGACGTTTC CCGTTGAATA TGGCTCATAA
TAAATTACCG CCGGAGCTCG TTCTGCAAG GGCAACTTAT ACCGAGTATT

6701 CACCCCTGT ATTACTGTTT ATGTAACCAG ACAGTTTTAT TGTTCATGAT
GTGGGGAACA TAATGACAAA TACATTGCTC TGTCAAAATA ACAAGTACTA

6751 GATATATTTT TATCTTGTGC AATGTACAT CAGAGATTTT GAGACACAC
CTATATAAA ATAGACACG TTACATTGTA GTCTCTAAAA CTCTCTCTTG

D=III

6801 GTGGCTTTC CCCCCCCCC ATTATTGAAG CATTATCAG GGTTATTGTC
CACCGAAAGG CCGGGGGGGG TAATAACTTC GTAAATAGTC CCAATAACAG

6851 TCATGAGCGG ATACATATTT GAATGTATTT AGAAAAATAA ACAATAGCG
AGTACTCGCC TATGTATAAA CTEACATAAA TCTTTTATT TGTTTATGCC

6901 GTTCGGCCCA CATTTCCTCCG AAAAGTCCCA CCTGACGTCT AAGAAACCAT
CAAGGCGCGT GTAAAGGGGC TTTTCACGGT GGAATCCAGA TTCTTTGGTA

6951 TACTATCATG ACATTAACTT ATAAAAATAG GCGTATCAGG AGCCCTTTTC
ATAATAGTAC TGTAAATTGA TATTTTATC CCCATAGTGC TCCGGGAAG

7001 GTC
CAG

09600766-051401

pVR 1012-G2(S)

General Description

DNA pVR 1012-GP(S)
 Local object
 Created: 09/14/98 03:58PM
 Last Modification Date: ? (no data)
 length: 7073 bp
 storage type: Basic
 form: Circular

Comments

Restriction Map

Ball: 1 site TGGCCA
 ACCGGT
 BclI: 1 site TCATCA
 ACTAGT
 ClaI: 1 site ATTCGAT
 TAGCTA
 DraIII: 1 site CACGCGTG
 GTGCGTCAC
 HindIII: 1 site AAGCTT
 TTCGAA
 KsaI: 1 site GCGGCC
 CCGCGG
 KpnI: 1 site GGTACC
 CCATGG
 NarI: 1 site GCGGCC
 CCCTCGG
 PmlI: 1 site CACGTG
 GTGCGAC
 PvuI: 1 site CGATCG
 GGTACG
 SacII: 1 site CCGCGG
 GCGGCC
 SalI: 1 site GTCGAC
 CXGCTG
 XbaI: 1 site TCTAGA
 AGATCG
 XmnI: 1 site GAAATGATTC
 CTTTGGGAAAG
 NdeI: 2 sites CATATG
 GTATAC
 EcoRV: 3 sites GATATC
 CTATAG
 SphI: 3 sites GCATGC
 CGTACG
 NcoI: 4 sites CCATGG
 GGTACG
 BamHI: 6 sites GGATCC
 CCTAGG

Functional Map

CDS (4 signals)

CMV IE 5' UT

09600766-051401

start: 886 End: 1129

CMV IE INT

start: 1130 End: 1840

TbGH

start: 4090 End: 4642

Kan r

start: 6138 End: 6760 (Complementary)

Misc_feature (2 signals)

CMV enhancer

start: 248 End: 885

GP(S)

start: 1870 End: 4089

Annotations

09600766 054401
TbGH

1 TCCGCGGTTT CCGTGATGAC GGTGAAAACC TCTGACACAT GCAGCTCCCG
 AGCGGCCAAA GCCACTACTG CCACCTTTGG AGACTGTGTA CGTCGAGGGC

51 GAGACGGTCA CAGCTTGTCT GTAAGCGGAT GCCGGGAGCA GACAAGCCCG
 CTCGCGCACT CTCGAACAGA CATTGCGCTA CGGCCCTCGT CTGTTGCGGC

101 TCAGGCCCCG TCAGCGGGTG TTGCGGGGTG TCGGGGCTGG CTTAACTATG
 AGTCGCGCGC AGTCGCGCAC AACCGCCAC AGCCCCGACC GAATTGATAC

NdeI

151 CGGCATCASA GCAGATTCTA CTGAGACTGC ACCATATGCG GTGTCAATA
 CCGGTAGTCT CGTCTAACAT GACTCTCAGC TGGTATACGC CACACTTTAT

BalI

201 CCGCACAGAT CGGTAAGGAG AAAATACCGC ATCAGATTGG CTATTGGCCA
 GCGGTGTCTA CGCATTCCCTC TTTATGGCG TAGTCTAACG GATAACCGGT

251 TTGCATACGT TGTATCCATA TCATAATATG TACATTATA TTGGCTCATG
 AACGTATGCA ACATAGGTAT AGTATTATAC ATGTAAATAT AACCGAGTAC

301 TCCACATTAA CCGCCATGTT GACATTGATT ATTGACTACT TATTAATAGT
 AGGTGTGAAT GCGCGTACAA CTGTAACATA TAACGTATCA ATAATTATCA

351 AATCAATTAC GGGGTCATTA GTTCATAGCC CATATATGGA GTTCCGCGTT
 TTAGTTAATG CCCCAGTAAT CAAGTATCGG GTATATACCT CAAGGCGCAA

401 ACAATACTTA CGGTAATAGG CCGCCCTGGC TGACCGCCCA ACCACCCCG
 TGTATTGAAT GCCATTACG GGGCGGACCG ACTGGCGGGT TGCTGGGGG

451 CCCATTACG TCAATAATGA CGTATGTTCC CATAGTAACG CCAATAGGGA
 GGGTAAGTGC AGTTATTACT GCATACAAGG GTATCATTGC GGTATCCCT

501 CTTTCCATTG ACGTCAATGG GTGGAGTAT TACGGTAAAC TGCCCACTTG
 GAAAGCTAAC TCCAGTTACC CACCTCATAA ATGCCATTG ACGGCTGAAC

NdeI

551 GCAGTACATC AAGTGTATCA TATGCCAAGT ACGCCCCCTA TTGACGTCAA
 CGTCATGTAG TTCACATAGT ATACGGTTCA TGGCGGGGAT AACTGCAGTT

601 TGACGGTAAA TGGCCCCGCT GGCATTATGC CCAGTACATG ACCTTATGGG
 ACTGCCATTI ACCGGGCGGA CCGTAATACG GGTCACTGAC TGGAAATACC

NcoI

651 ACTTCCCTAC TTGGCAGTAC ATCTACGTAT TAGTCATCGC TATTACCATG
 TGAAGCATG AACCGTCATG TAGATGCATA ATCAGTAGCG ATAATGGTAC

NcoI

701 GTGATCGGGT TTTGGCAGTA CATCAATGGG CGTGGATACC GGTTCGACTC
 CACTACGCCA AAACCGTCAT GTAGTTACCC GCACCTATCG CCAAACAGAG

751 ACGGGGATTT CCAAGTCTCC ACCCCATTGA CGTCAATGGG AGTTTGTTTT
 TGCCCTTAAA CGTTCAGAGG TGGGGTAACT GCAGTTACCC TCAACAAAA

09600766-054401

801 GGCACCAAAA TCAACGGGAC TTTCACAAAT GTCGTAACAA CTCCGCCCCA
CCGTGGTTTT AGTTGGCCCTG AAAGGTTTTA CAGCATTGTT GAGGCGGGGT

851 TTGACCAAAA TGGGCGGTAG CCGTGTACGG TGGGAGGTCT ATATAAGCAG
AACTGGGTTT ACCCGCCATC CGCACATGCC ACCCTCCAGA TATATTGGTC

901 AGCTCGTTTA GTGAACCGTC AGATCGGCTG GAGACGCCAT CCACGCTGTT
TCGAGCAAA TCACTTGGCAG TCTAGCGGAC CTCTCCGGTA GGTCCGACAA

SacII

951 TTGACCTCCA TAGAAGACAC CGGACCCGAT CCAGCCTCCG CGGCGGGGAA
AACTGGAGGT ATCTTCTGTG GCCCTGGCTA GGTCCGAGGC GCCGCGCCTT

1001 CGGTGCATTG GAACGCGGAT TCCCCGTGCC AAGAGTGACG TAAGTACCGC
GCCACGTAAC CTTGCGCCTA AGGGGCACGG TTCTCACTGC ATTCATGGCG

SphI

1051 CTATAGACTC TATAGGCACA CCCCTTTGGC TCTTATGCAT GCTATACTGT
CATATCTGAG ATATCCGTGT GGGGAAACCG AGAATACGTA CGATATGACA

1101 TTTTGGCTTG GGGCCTATAC ACCCCCGCTT CCTTATGCTA TAGGTGATGG
AAAACCGAAC CCCGGATATG TGGGGCCGAA GGAATACGAT ATCCACTACC

1151 TATAGCTTAG CCTATAGGTG TGGGTTATTG ACCATTATTG ACCACTCCCC
ATATCGAATC GGATATCCAC ACCCAATAAC TGGTAATAAC TGGTGAGGGG

1201 TATTGGTGAC GATACTTCC ATTACTAATC CATAACATGG CTCCTTGCCA
ATAACCACTC CTATGAAAGG TAATGATTAG GTATTGTACC GAGAAACGGT

1251 CAACATATTC TATTGGCTAT ATGCCAATAC TCTGTCTTTC AGAGACTGAC
GTTGATAGAG ATAACCGATA TACGCTTATG AGACAGGAAG TCTCTGACTG

1301 ACCGACTCTG TATTTTACA GGATGGGGTC CCACTTATTA TTTCACAAAT
TGCCTGACAC ATAAAAATG CCAACCCAG GGTAAATAAT AAATGTTAA

1351 CACATATACA ACAACGGCGT CCCCCGTGCC CGCACTTTT ATTAAACATA
GTGTATATGT TGTGCGGCA GGGGGCACGG CGGTCAAAA TAATTGTAT

1401 CCGTGGGATC TCCACCGGAA TCTCGGGTAC GTGTCCGGA CATGGGCTCT
CGCACCCTAG AGGTGCGCTT AGAGCCCATC CACAAGGCCT GTACCCGAGA

1451 TCTCCGGTAG CGGCGGAGCT TCCACATCCG AGCCCTGGTC CCATGCCCTC
AGAGCCCATC GCCGCTCGA AGGTGTAGGC TCGGGACCAG GGTACGGAGG

1501 AGCGGCTCAT GGTGCTCGG CAGCTCCTTG CTCCTAACAG TGGAGGCCAG
TCGCCGAGTA CCAGCGAGCC GTCGAGGAAC GAGGATTGTC ACCTCCGGTC

1551 ACTTAGGCAC AGCACAATCC CCACCACCAC CAGTGTGCCG CACAAGGCCG
TGAATCCGTG TCGTGTACG GGTGGTGGTG GTCACACGGC GTGTTCCGGC

1601 TGGCGGTAGG GTATGTGTCT GAAAATGAGC GTGGAGATTG GGCTCGCAGC
ACCGCCATCC CATACACAGA CTTTACTCG CACCTCTAAC CCGAGCGTGC

1651 CCGTACGCGAG ATGGAAGACT TAAGGCAGCG GCAGAAGAAG ATCCAGGCAG
CGACTGCGTC TACCTTCTGA ATTCCGTCCG CGTCTTCTTC TACGTCCGTC

1701 CTGAGTTCTT GTATTCTGAT AAGAGTCAGA GTAACTCCC GTTGCCGTGC
GACTCAACAA CATAAGACTA TTCTCAGTCT CCATTGAGGG CAACGCCACG

1751 TGTAAACGGT GGAGGGCAGT GTAGTCTGAG CAGTACTCGT TGCTGCCCGG
ACAATTGCCA CCTCCCGTCA CATCAGACTC GTCATGACCA ACGACGGCGC

NcoI

1801 CGCGCCACCA GACATAATAG CTGACAGACT AACAGACTGT TCCTTTCCAT
GCCCGGTGGT CTGTATTATC GACTGTCTGA TTGTCTGACA AGGAAAGGTA

Sall

NcoI

PmlI BclI EcoRV

1851 CGGTCTTTTC TGCAGTCACC GTGGTCGACA CGTGTGATCA GATATCCGGG
CCCAGAAAAG ACCTCAGTGG CAGCAGCTGT GCACACTAGT CTATAGCGCC

SphI

EcoRV

1901 CGGCTTAGC TAGATGCATG CTCGAGCGGC CGCCAGTGTG ATGGATATCT
GGCGAGATCG ATCTACGTAC GAGCTCCCG GCGCTCACAC TACCTATAGA

NcoI

1951 GCAGAACTCT ATCTTCAGGA TCTGCCCATG GAGGGTCTTA GCCTACTCCA
CGTCTTAAGA TAGAAGTCCT AGAGCGGTAC CTCCCAGAA CTGATGAGGT

2001 ATTGCCCAGA GATAAATTC GAAAAAGCTC TTCTTTGTT TGGGTCACTA
TAACGGGTCT CTATTAAAG CTTCTTCGAG AAAGAAACA ACCCAGTAGT

2051 TCTTAATCA AAAGCCCTTT TCCATGCCCT TGGGTGTTGT GACCAACAGC
AGAATAAGT TTTCCGGAAA AGGTACGGAA ACCCACAACA CTGGTTGTCG

2101 ACTTTAGAAG TAACAGAGAT TGACCAGCTA GTCTGCAAGG ATCATCTTGC
TGAATCTTC ATTGTCTCTA ACTGGTCGAT CAGACGTTCC TAGTAGAAGC

2151 ATCAACTGAC CAGCTGAAAT CAGTTGGTCT CAACCTCGAG GGGAGCGGAG
TAGTTGACTG GTCGACTTTA CTCACCCAGA GTTGGAGCTC CCCTCGCCTC

EcoRV

2201 TATCTACTGA TATCCCATCT GCGACAAAGC GTTGGGGCTT CAGATCTGGT
ATAGATGACT ATAGGGTAGA CGCTGTTTCG CAACCCCGAA GTCTAGACCA

2251 GTCCCTCCCC AAGTGGTCAG CTATCAAGCA GGAGATGGG CTGAAAATTG
CACGGAGGGG TTCACCACTC GATACTCGT CCTCTTACCC GACTTTTAAAC

2301 CTACAATCTT GAAATAAAGA AACCGGACGG GACCGAATGC TTACCCCCAC
GATGCTAGAA CTTTATTCTT TTGGCCTGCC CTGGCTTACG AATCGGGGTG

2351 CGCCGGATCG TGTCAAGGC TTTCCAAGGT GCGGCTATGT TCACAAAGCC
GCGGCCTACC ACAGTCTCCG AAAGGTTCCA CGCGGATACA AGTGTTCGG

2401 CAAGGAACCG GGCCTGCCC GGGTGACTAC GCCTTTCACA AGGATCGAGC
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2451 TTCTTCTCTC CATGACAGCC TGGCTTCAAC TGTAATTTAC AGAGGAGTCA
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2501 ATTTTCTGA GCGGGTAATC GCATTCTTGA TATTGGGTAA ACCAAAGGAA
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2551 ACGTTCTTTC AATCACCCCC CATTGAGAG GCAGCAAACT ACACGAAAA
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2601 TACATCAAGT TACTATGCCA CATCCTACTT GGAGTACGAA ATCGAAAAAT
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2651 TTGGTGCTCA ACACCTCCACG ACCCTTTTCA AAATTAACAA TAATACTTTT
ATCCACGAGT TGTGAGGTGC TGGGAAAAGT TTTAATTGTT ATTATGAAAA

2701 GTTCTTCTGG ACAGGCCCCA CACGCCTCAG TTCTTTTCC AGCTGAATGA
CAAGAGACC TGTCCGGGGT GTCCGGAGTC AAGGAAAAGG TCGACTTACT

2751 TACCATTCAA CTTCAACCAAC AGTTGAGCAA CACAACGGG AAACATAATT
ATCGTAAGTT GAAGTGCTTG TCAACTCGTT GTGTGACCC TTTGATTAAA

2801 GGCACCTAGA TGCTAATATC AATGCTGATA TTGCTGAATC GGCTTTTGG
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2851 GAAATAAAAA AAATCTCTCC GAACAACATC GTGGAGAAGA GCTGTCTTTC
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2901 GAACTTTTAT CGCTCAACGA GACAGAAGAC CATGATGCCA CATCGTCGAG
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2951 AACTACAAAG GGAAGAATCT CCGACCGGGC CACCAGGAAG TATTGGGACC
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3001 TGGTTCCAAA GGATTCCTCT GGGATGGTTT CATTGCACGT ACCAGAAGGG
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3051 GAAACAACAT TGCCGTCTCA GAATTCGACA GAAGGTGCAA GAGTACATGT
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3101 GAATACTCAG GAAACTATCA CAGAGACAAC TGCAACAATC ATAGGCCTA
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3151 ACGGTAACAA CATGCAGATC TCCACCATCG GGACAGGACT GAGCTCCAGC
TGCCATTGTT GTACGCTAG AGGTGGTAGC CCTGTCTCA CTCGAGGTG

NotI

3201 CAATCTCTGA GTTCTCACC GACCATGCCA CCAAGCCCTG AGACTCAGAC
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3251 CTCCACAACC TACACACCAA AACTACCAAT GATGACCACC GAGGAACCAA
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3301 CACCAACCAC GAGAAACTCT CCTGGCTCAA CAACAGAAGC ACCCACTCTC
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3401 GTCCACAAGC AACGGTCTAA TAACTTCAAC AGTAACAGGT ATTCTTGGGA
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3451 GCCTTGGACT TCGAAAACGC AGCAGAAGAC AAGTTAACAC CAGGGCCACG
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3501 GGTAATGCCA ATCCCAACTT ACACTACTGG ACTGCACAAG AACAAATATA
CCATTACGT TAGGGTTGAA TGTGATGACC TGACGTGTTT TTGTTGTATT

BamHI

3551 TGCTGCTGGG AITGCCCTGA TCCCGTACTT TCGACCGGGT GCAGAAGGCA
ACGACGACCC TAACCGACCT AGGGCATGAA ACCTGGCCCA CGTCTTCCGT

3601 TATCACTGA AGGCCTTATG CACAACCAA ATGCCTTAGT CTGTGGACTC
ATATGCACT TCCGGAATAC GTCTTGGTTT TACGGAATCA CACACCTGAG

3651 AGCAAACTTG CAAATGAAC AACTCAAGCT CTGCAGCTTT TCTTAAGGGC
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3701 CACGACGGAG CTGCGGACAT ATACCATACT CAATAGGAAG CCCATAGATT
GTGCTGCCCTC GACGCCGTGA TATGGTATGA GTTATCCTC CGGTATCTAA

BamHI

3751 TCCTTCTGCG ACGATGGGCC GGGACATCTA GGATCCTGGG ACCAGATTGT
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3801 TGCATTGACC CACATGATTG GACCAAAAAC ATCACTGATA AAATCAACCA
ACGTAACTCG GTGTACTAAC CTGGTTTTTG TAGTGACTAT TTAGTTGGT

3851 AATCATCCAT GATTTCATCG ACAACCCCTT ACCCAATCAG GATAATGATG
TTASTAGGTA CTAAGTAGC TGTGGGAAA TGGGTAGTC CTATTACTAC

BamHI

3901 ATAATTGGTG GACGGGCTGG AGACAGTGA TCCCTGCAGG AATAGGCATT
TATTAACCA CTGCCCAGCC TCTGTACCT AGGGACGTCC TTATCCGTAA

3951 ACTGGAATTA TTATGCAAT CATTGCTCTT CTTTGGCTCT GCAAGCTGCT
TGACCTTAAT AATAACGTTA GTAACGAGAA GAAACCCAGA CGTTCGACGA

BamHI

4001 TTGTTGAATA TCAGAATTCC AGCACTGGCG GCCGTTACTA GTGGATCCGA
AACAACTTAT AGTCTTAAGG TCGTGACCGC CGGCAATGAT CACCTAGGCT

NarI

BamHI

XbaI

KasI

BamHI

4051 GCTCGGATCC AAGCTCTAGA CCAGCGCCCT GGATCCAGAT CTGCTGTGCC
CGACCTAGG TTCCAGATCT GCTCCGCGGA CCTAGGTCTA GACGACACGG

4101 TTCTAGTTGC CAGCCATCTG TTGTTTGGCC CTCCCCGTG CTTTCCCTGA
AAGATCAACC GTCCGTAGAC AACAAACGGG GAGGGGGCAC GGAAGGAATT

4151 CCTGGAAGG TGCCACTCCC ACTGTCTTTT CCTAATAAAA TGACGAAATT
GGGACCTTCC ACGGTGAGGG TGACAGGAAA GGATTATTTT ACTCCTTTAA

4201 GCATCGCATT GTCTGAGTAG GTGTCTCTT ATTCTGGGGG GTGGGGTGGG
CGTAGCGTAA CAGACTCATC CACAGTAAGA TAAGACCCCC CACCCCACCC

SphI

4251 CCAGCACAGC AAGCGGGAGG ATTGGGAAGA CAATAGCAGG CATGCTGGGG
CGTCGTGTCTG TTCCCCCTCC TAACCCTTCT GTTATCGTCC GTACGACCCC

KpnI

4301 ATCGGGTGGG CTCTATGGGT ACCCAGGTGC TGAAGAATTG ACCCGGTTC
TAGGCCACCC GAGATACCCA TGGGTCCACG ACTTCTTAAC TGGGCCAAGG

4351 TCCTGGGCCA GAAAGAAGCA GGCACATCCC CTTCTCTGTG ACACACCCGT
AGGACCCGGT CTTTCTTCTG CCGGTAGCGG GAAGAGACAC TGTGTGGGAC

4401 TCCACGCCCC TGGTTCTTAG TTCCAGCCCC ACTCATACGA CACTCATAGC
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4451 TCAGGAGGCG TCCGCCCTCA ATCCACCCCG CTAAAGTACT TGGAGCGGTC
AGTCCCTCCG AGCGGGAAGT TAGGGTGGCG GATTTCATGA ACCTCGCCAG

4501 TCTCCCTCCC TCATCAGCCC ACCAAACCAA ACCTAGCCTC CAAGAGTGGG
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4551 AAGAAATTAA ACCAAGATAG GCTATTAAAT GCAGAGGGAG AGAAATGCC
TCTTTAATT TCGTTCTATC CGATAATTCA CGTCTCCCTC TCTTTACGG

XbaI

4601 TCCATCATGT GAGGAAGTAA TGAGAGAAAT CATAGATTT CTTCGGCTTC
AGGTTGTACA CTCCTTCATT ACTCTCTTAA GTATCTTAA GAAGCGCAAG

4651 CTCGCTCACT GACTCGCTGC GCTCGGTCTG TCGGCTCGCG CGAGCGGTAT
GAGCGAGTGA CTGAGCGAGG CGAGCCAGCA AGCCGACGCC CCTCGCCATA

4701 CAGCTCACTC AAAGGCGGTA ATACGGTTAT CCACAGAATC AGGGGATAAC
GTCGAGTGAG TTTCCGCCAT TATGCCAATA GGTGTCTTAG TCCCCTATTG

4751 GCAGGAAGA ACATGTGAGC AAAAGGCCAG CAAAAGGCCA GGAACCGTAA
CGTCTTCT TGTACACTCG TTTTCCGGTC GTTTCCGGT CCTTGGCATT

4801 AAAGCCCGCG TTGCTGGCGT TTTCCATAG GCTCCGCCCC CCTGACGAGC
TTTCCGGCGC AACGACCGCA AAAAGGTATC CGAGGCGGGG GGACTGCTCG

4851 ATCACAAAAA TCGACGCTCA ACTCAGAGGT GGCGAAACCC GACAGGACTA
TAGTGTCTTT AGCTCGGAGT TCAGTCTCCA CCGCTTTGGG CTGTCTGAT

4901 TAAAGATACC AGCGGTTTCC CCTGGAAGC TCCCTCGTGC GCTCTCCTGT
ATTCTATGCG TCCGCAAGG GGGACCTTCG AGGGAGCAGG CGAGAGGACA

4951 TCCGACCCCTG CCGCTTACCG GATACCTGTC CGCCTTCTC CCTTCGGGAA
AGGCTGGGAC GCGGAATGGC CTATGGACAG GCGGAAAGAG GGAAGCCCTT

5001 GCGTGGCGCT TTCTCAATCC TCACCGTGTA GGTATCTCAG TTCGGTGTAG
CGCACCCGCA AAGAGTTACG AGTCCGACAT CCATAGAGTC AAGCCACATC

5051 GTCGTTCCCT CCAAGCTGGG CTGTGTGCAC GAACCCCCCG TCCAGCCCCG
 CAGCAAGCGA GGTTCGACCC GACACACCTG CTTGGGGGGC AAGTCGGGCT

 5101 CCGCTGCGCC TTATCCGGTA ACTATCGTCT TCAGTCCAAC CCGGTAAGAC
 GCGGACGCGG AATAGGCCAT TGATAGCAGA ACTCAGGTTG GGCATTCTG

 5151 ACCGATTATC GCCACTGGCA GCAGCCACTC GTAACAGCAT TAGCAGAGCG
 TGCTGAATAG CCGTGACCGT CGTCGGTGAC CATTGTCTTA ATCGTCTCGC

 5201 AGGTATGTAG GCGGTGCTAC AGAGTCTTGT AAGTCGTGGC CTAACACGG
 TCCATACATC CCCCACGATG TCTCAAGAAC TTCACCACCG GATTGATGCC

 5251 CTACACTAGA AGGACAGTAT TTGGTATCTG CGCTCTCTG AAGCCAGTTA
 GATGTGATCT TCCTGTGATA AACCATAGAC GCGAGACGAC TTCGGTCAAT

 5301 CCTTCGGAAA AAGAGTTGGT AGCTCTTGAT CCGGCAACA AACCACCGCT
 GGAAGCCTTT TTCTCAACCA TCGAGAACTA GCGCGTTTGT TTCGTGGCGA

 5351 GGTAGCGGTG GTTTTTTTGT TTGCAAGCAG CAGATTACGC GCAGAAAAA
 CCATCGCCAC CAAAAAACA AACGTTCTGC GTCTAATGCC CGTCTTTTTT

 5401 AGGATCTCAA GAAGATCCTT TGATCTTTTC TACGGGGTCT GACGCTCAGT
 TCCTAGAGTT CTCTAGGAA ACTAGAAAAC ATGCCCCAGA CTGCGAGTCA

 5451 GGAACGAAAA CTCACGTTAA GGGATTTTGG TCATGAGATT ATCAAAAAGG
 CCTTGCTTTT GAGTGCAATT CCCTAAAACC AGTACTCTAA TAGTTTCTCC

 5501 ATCTTCACCT AGATCCTTTT AAATTAAAAA TGAAGTTTAA AATCAATCTA
 TAGAAGTGA TCTAGGAAA TTTAATTTTT ACTTCAAAAT TTAGTTAGAT

 5551 AAGTATATAT GAGTAAACTT GGTCTGACAG TTACCAATGC TTAATCAGTG
 TTCATATAA CTCATTTGAA CCAGACTGTC AATGGTTACG AATTAGTCAC

 5601 AGGCACCTAT CTCACGATC TGTCTATTTC GTTCATCCAT AGTCCCTGA
 TCCGTGGATA GAGTCGCTAG ACAGATAAAG CAAGTAGGTA TCAACGGACT

 5651 CTCGGGGGGG GGGGGGCGCT GAGGTCTGCC TCGTGAAGAA GGTGTTGCTG
 GAGGCCCCC CCCCCGCGA CTCAGACGG AGCACTTCTT CCACAACGAC

 5701 ACTCATACCA GGCCTGAATC GCCCCATCAT CCAGCCAGAA AGTGAGGGAG
 TGAGTATGTT CCGGACTTAG CCGGGTAGTA GGTGGTCTT TCACTCCCTC

 5751 CCACGGTTGA TGAGAGCTTT GTTGTAGGTG GACCAGTTGG TGATTTTGA
 GGTGCCAAT ACTCTCGAAA CAACATCCAC CTGGTCAACC ACTAAAATT

 5801 CTTATGCTTT GCCACGGAAC GGTCTCCGTT GTCGGGAAGA TCCGTGATCT
 GAAAACGAAA CCGTGCCTTG CCAGACGCAA CAGCCCTTCT ACGCACTAGA

 5851 GATCCTTCAA CTCAGCAAAA GTTCGATTTA TTCAACAAA GCGCCCTCCC
 CTAGGAAGTT GAGTCGTTTT CAAGCTAAAT AAGTTGTTTC GCGGCGAGG

 5901 GTCAAGTCAG COTAATGCTC TGCCAGTGTT ACAACCAATT AACCAATTCT
 CAGTTCAGTC GCATTACGAG ACGGTCACAA TOTTGGTTAA TTGGTTAAGA

 5951 GATTAGAAA ACTCATCGAG CATCAAATGA AACTGCAATT TATTCATATC
 CTAATCTTTT TGAGTAGCTC GTAGTTTACT TTCACGTTAA ATAAGTATAG

6001 AGGATTATCA ATACCATATT TTTGAAAAAG CCGTTTCTGT AATGAAGGAG
TCCTAATAGT TATGGTATAA AAACTTTTTC GCCAAAGACA TTACTTCCTC

6051 AAAACTCACC GAGGCAGTTC CATACGATGG CAAGATCCTG GTATCGGTCT
TTTTGAGTGG CTCCGTCAGG GTATCCTACC GTTCTAGGAC CATACCCAGA

6101 GCGATTCCGA CTCGTCCAAC ATCAATACAA CCTATTAAAT TCCCTTCGTC
CGCTAAGGCT GAGCAGGTG TAGTTATGTT CGATAATTAA AGGGGAGCAG

6151 AAAATAAGG TTATCAAGTG AGAAATCACC ATCAGTGAGC ACTGAATCCG
TTTTTATTC AATAGTTTAC TCTTAGTGAG TACTCACTGC TGACTTAGGC

HindIII

6201 GTGAGATGG CAAAAGCTTA TGCATTTCTT TCCAGACTTG TCCAACAGGC
CACTCTTACC GTTTTCCAAT ACGTAAAGAA AGGTCTGAAC AAGTTGTCCG

6251 CAGCCATTAC GCTCGTCATC AAAATCAGTC GCATCAACCA AACCGTTATT
GTCCGTAATG CGAGCAGTAG TTTTAGTGAG CCTAGTTGCT TTGGCAATAA

PvuI

6301 CATTCTGAT TCCGCTGAG CGAGACGAAA TACCGGATCG CTCTTAAAAG
GTAGCACTA ACGCGGACTC GCTCTGCTTT ATGCGGTAGC GACAATTTTC

6351 GACATTACA AACAGGAATC GAATGCAACC GCGCCAGGAA CACTGCCAGC
CTGTAAATGT TTGTCCCTAG CTTACGTTGG CCGGCTCCTT GTGACGGTCG

6401 GCATCAACAA TATTTTCACC TGAATCAGGA TATCTTCTA ATACCTGGAA
CGTAGTTGTT ATAAAAGTGG ACTTAGTCTT ATAAGAAGAT TATGGACCTT

6451 TGCTGTTTC CCGGGGATCG CAGTGGTGAG TAACCATGCA TCATCAGGAG
ACGACAAAAG GCGCCCTACC GTCACCACTC ATTGGTACGT ACTAGTCTC

6501 TACCGATAAA ATGCTTGATG GTCGGAAGAG GCATAAATC CGTCAGCCAG
ATGCTTATT TACGAACTAC CAGCCTTCTC CGTATTAAAG GCAGTCGGTC

6551 TTTAGTCTGA CCATCTCATC TGTAACATCA TTGGCAACGC TACCTTTGCC
AAATCAGACT GGTAGAGTAG ACATTGTAGT AACCGTTGCG ATGGAACCGG

ClaI

6601 ATCTTTCAGA AACAACTCTG GCGCATCGGG CTTCCTATAC AATCGATAGA
TACAAAGTCT TTGTTGAGAC CCGGTAGCCC GAAGGGTATG TTAGCTATCT

6651 TTGTCCACC TGATTGCCC ACATTATCCC GAGCCCATTT ATACCCATAT
AACAGCGTGG ACTAACGGGC TGTAAATAGCG CTCGGGTAAA TATGGGTATA

6701 AAATCAGCAT CCATGTTGGA ATTTAATCGC GGCCTCGAGC AAGACGTTTC
TTTAGTGGTA GGTACAACCT TAAATTAGCG CCGGAGCTCG TTCTGCAAG

6751 CCGTTGAATA TGGCTCATAA CACCCCTTGT ATTACTGTTT ATGTAAGCAG
GGCACTTAT ACCGAGTATT GTGGGGAACA TAATGACAAA TACATTGCT

6801 ACAATTTTAT TGTTTCATGAT GATATATTTT TATCTTGTCG AATGTAACAT
TGTCAAAATA ACAAGTACTA CTATATAAAA ATAGAACACG TTACATTGTA

DraIII

6851 CAGACATTTT GAGACACAC GTGGCTTTCC CCCCCCCCC ATTATTGAAG
CTCTCTAAAA CTCTGTGTTG CACCCAAAAG GCGGGGGGGC TAATAACTTC

6901 CATTATCAG GOTTATTGTC TCATGAGCGG ATACATATTT GAATGTATTT
GTAAATAGTC CCAATAACAG AGTACTCGCC TAGGTATAAA CTACATAAA

6951 AGAAAAATAA ACAAAATAGGG GTTCCGCCCA CATTTCGCCG AAAAGTGCCA
TCITTTTTATT TGTTTATCCC CAAGGCCCGT GTAAAGGGGC TTTTCACGGT

7001 CCTCAGTCT AAGAAACCAT TATTATCATG ACATTAACTT ATAAAAATAG
GCACTGCAGA TTCTTTGGTA ATAATAGTAC TGTAATGGA TATTTTATC

7051 GCGTATCAG AGCCCTTTTC CTC
CGCATAGTGC TCCGGGAAAG CAG

09500766-054404

SEQUENCE LISTING ID NO: 3

pVR 1012-GP(Z)

General Description

DNA pVR 1012-GP(Z)
 Local object
 Created: 09/15/98 05:06PM
 Last Modification Date: ? (no data)
 length: 7285 bp
 storage type: Basic
 form: Circular

Comments

Restriction Map

DraIII: 1 site CACCKKNGTG
 GTCKKCTAC
 HindIII: 1 site AAGCTT
 TTGGA
 HpaI: 1 site GTTAC
 CAATTG
 KsaI: 1 site GCGGCC
 CTCGGG
 NarI: 1 site GCGGCC
 CTCGGG
 NotI: 1 site GCGGCCGC
 CGCCGGCG
 PmlI: 1 site CACGTG
 GTGCAC
 PvuI: 1 site CGATCG
 GCTAGC
 SacII: 1 site CCGCGG
 GGCGCC
 XbaI: 1 site TCTAGA
 AGATCT
 XhoI: 1 site CTCGAG
 GAGCTC
 EcoRV: 2 sites GATATC
 CTATAG
 NcoI: 2 sites CCATGG
 GGTACC
 NdeI: 2 sites CACATG
 GTATAC
 SphI: 2 sites GCATGC
 CGTACG

Functional Map

CDS (4 signals)

CMV IE 5' UT

Start: 886 End: 1129

CMV IE INT

Start: 1130 End: 1840

TbGH

Start: 4302 End: 4854

Kan^r

Start: 6350 End: 6972 (Complementary)

09600766-051401

Misc_feature (2 signals)

CMV enhancer

Start: 248 End: 885

GP(Z)

Start: 1870 End: 4301

Annotations

09600766-051401

1 TCGGCGGTTT CGGTGATGAC GGTGAAAACC TCTGACACAT GCAGCTCCCG
 ACCGCGCAGA GCCACTACTG CCACTTTTGG AGACTGTGTG CGTCGAGGGC

 51 GAGACGGTCA CAGCTTGTCT GTAAACGGAT GCCGGGAGCA GACAAGCCCG
 CTCTGCCAGT GTCGAACAGA CATTCGCCCTA CGGCCCTCGT CTGTTCCGGC

 101 TCAGGGCGCG TCAGCGGGTG TTGGCGGGTG TCGGGGCTGG CTTAACTATG
 AGTCCCGCGC AGTCGCCCCAC AACCGCCAC AGCCCCGACC GAATTGATAC

NdeI

151 CGGCATCAGA GCAGATTGTA CTGAGAGTGC ACCATATGCG GTGTGAATA
 CGCGTAGTCT CGTCTAACAT GACTCTCAG TGGTATACGC CACACTTTAT

 201 CCGCACAGAT CGGTAAAGGAG AAAATACCGC ATCAGATTGG CTATTGGCCA
 GCGGTGTCTA CGCATTCCTC TTTTATGCGG TAGTCTAACG GATAACCGGT

 251 TTGCATACGT TGTATCCATA TCATAATATG TACATTATA TTGGCTCATG
 AACGTATCCA ACATAGGTAT AGTATTATAC ATGTAAATAT AACCGAGTAC

 301 TCCAACATTA CCGCCATGTT GACATTGAT ATTGACTAGT TATTAAATAGT
 AGGTGTATAT GCGCGTACAA CTGTAACTAA TAACTGATCA ATAAATTATCA

 351 AATCAATTAC GCGGTCATTA GTTCATAGCC CATATATGGA GTTCGCGCTT
 TTAGTTAATG CCCCAGTAAT CAAGTATCGG GTATATACCT CAAGCGCGAA

 401 ACATAACTTA CGGTAAATGG CCCGCCGTGC TGACCGCCCA ACGACCCCG
 TGTATTGAAT CCGATTTACC GCGCGGACCG ACTGGCGGGT TGCTGGGGGC

 451 CCCATTGACG TCAATAATGA CGTATGTTCC CATAGTAACG CCAATAGGGA
 GGGTAACTGC AGTTATTACT GCATACAAGG GTATCATGCG GGTATCCCT

 501 CTTTCCATTG ACGTCAATGG GTCGAGTATT TACGGTAAAC TGCCCACTTG
 GAAGGTAAC TGCAGTTACC CACCTCATAA ATGCCATTG ACGGGTGAAC

NdeI

551 GCAGTACATC AAGTGTATCA TATGCCAAGT ACGCCCCCTA TTGACGTCAA
 CGTCATGTAG TTCACATAGT ATACGGTTCA TGCGGGGGAT AACTGCAGTT

 601 TGACCGTAAA TGGCCCCCCT GGCATTATGC CCAGTACATG ACCTTATGGG
 ACTGCCATTG ACCGGGCGGA CCGTAATACG GGTATGTAC TGAATACCC

NcoI

651 ACTTCTCTAC TTGGCAGTAC ATCTACGTAT TAGTCATCGC TATTACCATG
 TGAAGGATG AACCGTCATG TAGATGCATA ATCAGTAGCG ATATGGTAC

NcoI

701 GTGATCGCGT TTTGGCAGTA CATCAATGGG CGTCGATAGC GGTGTGACTC
 CACTACGCCA AAACCGTCAT GTAGTTACCC GCACCTATCG CCAAACTGAG

 751 ACCGGGACTT CCAAGTCTCC ACCCATTTGA CGTCAATGGG AGTTTGTATT
 TCGCCCTAAA GGTTCAGAGG TGGGGTAACT GCAGTTACCC TCAAAACAAA

 801 GGCACCAAAA TCAACGGGAC TTTCCAAAAT GTCGTAACAA CTCCGCCCCA
 CCGTGGTTTT AGTTGCCCTC AAAGGTTTTA CAGCATGTGT GAGGCGGGGT

851 TTGACGCAAA TGGCGCGTAG GCGGTACGG TCGGAGGTCT ATATAAGCAG
AACTGCGTTT ACCCGCCATC CGCACATGCC ACCCTCCAGA TATATTGCTC

901 AGCTCGTTTA GTGAACCGTC AGATCGGCTG GAGACGCCAT CCACCGTGT
TCGACCAAT CACTTGGCAG TCTAGCGGAC CTCTCCGGTA GGTGCGACAA

SacII

951 TTGACCTCCA TAGAAGACAC CGGGACCGAT CCAGCCTCCG CGGCGCGGAA
AACTGGAGGT ATCTTCTGTG GCGCTGGCTA GGTCCGAGGC GCCGCGCCTT

1001 CCGTGCAATG GAACCGGGAT TCCCGGTGCC AAGAGTGACG TAAGTACCGC
GCCACGTAAC CTTGCGCCTA AGGGGCACGG TTCTCACTGC ATTCAATGGC

SphI

1051 CTATAGACTC TATAGGCACA CCCCTTTGCG TCTTATGCAT CCTACTGT
GACATCTGAG ATATCGGTGT GGGGAAACCG AGAATACGTA CGATATGACA

1101 TTTTGGCTTG GCGCCTATAC ACCCCCGCTT CCTTATGCTA TAGGIGATGG
AAACCGAAC CCCGGATATG TGGGCGCGAA GGAATACGAT ATCCACTACC

1151 TATAGCTTAG CCTATAGGTG TGGGTATTG ACCATTATG ACCACTCCCC
ATATCGAATC GGATATCCAC ACCCAATAAC TGGTAATAAC TGGTGACGGG

1201 TATTGGTGAC GATACTTCC AATACTAATC CATAACATGG CTCTTTGCCA
ATAACCACTG CTATGAAGC TAATGATTAG GTATTGTACC GAGAAACGGT

1251 CAATATCTC TATTGGCTAT ATGCCAATAC TCTGTCTTC AGAGACTGAC
GTGTATAGAG ATAACCGATA TACGGTTATG AGACAGGAAG TCTCTGACTG

1301 ACGGACTCTC TATTTTACA GGATGGGGTC CCATTATTA TTTACAAAT
TGCCTGACAC ATAAAAATGT CCTACCCAG GGTAAATAAT AAATGTTTAA

1351 CACATATACA ACAACGCCGT CCCCCGTGCC CGCAGTTT ATTAAACATA
GTGTATATGT TGTTCGGCA GGGGGCACGG CGGTCAAAA TAATTTGTAT

1401 CGGTGGGATC TCCACCGGAA TCTCGGTAC GTGTCCGGA CATGGGTCT
CGCACCTAG AGGTGCGCT AGAGCCCATG CACAAGGCCT GTACCCGAGA

1451 TCTCCGTAG CGCGGAGCT TCCACATCCG AGCCCTGGTC CCATGCCCTC
AGAGGCCATC CCGCCTCGA AGGTGTAGG TCGGGACCAG GGTACGGAGG

1501 AGCGGCTCAT GTCGGCTCGG CAGCTCCTG CTCCTAACAG TGGAGCCAG
TCCCGAGTA CCAGCGAGCC GTCGAGGAAC GAGGATTCTC AACTCCGGTC

1551 ACTTAGGCAC AGCACAATC CCACCACCAC CAGTGTCCG CACAAGCCG
TGAATCCGTG TCGTGTACG GGTGGTGGT GTCACACCGC GTGTCCGGC

1601 TGGCGGTAGG GTATGTGTCT GAAATGAGC GTGGACATG GGCTCGCACG
ACCCCATCC CATACACAGA CTTTACTCG CACCTTAAC CCGAGCGTGC

1651 GCTGACGCAG ATGGAAGACT TAAGCCACCG CCAGAGGAG ATGCAGGCAG
CGACTCCGTC TACCTTCTGA ATTCCGTCCG CGTCTTCTC TACGTCCGTC

1701 CTGAGTTGTT GTATTCTGAT AAGAGTCAGA GGTAACTCCG GTTGGCGTGC
GACTCAACA CATAGACTA TTCTCACTCT CCATTGAGG CAACGCCACG

<u>HpaI</u>				
1751	TGTTAACGGT	GGAGCGCAGT	GTAAGCTGAG	CAGTACTCGT
	ACAATTGCCA	CCTCCCGTCA	CATCAGACTC	GTCATGAGCA
	ACGACGGCCG			
.....				
<u>NcoI</u>				
1801	CGCGCCACCA	GACATAATAG	CTGACAGACT	AACAGACTGT
	GCGCGGTGGT	CCTGATTATC	GACTGTCTCA	TTGTCTGACA
	AGGAAAGCTA			
.....				
<u>NcoI</u>		<u>PstI</u>		<u>EcoRV</u> <u>NotI</u>
1851	GGGTCTTTTC	TGCACTCACC	GTCCTCGACA	CCTGTGATCA
	CCCAGAAAAG	ACGTCAAGTG	CAGCAGCTGT	GCACACTAGT
	CTATAGCGCC			
.....				
<u>NarI</u>				
<u>NotI</u> <u>XbaI</u>		<u>KasI</u>		
1901	CCGCTCTAGA	CCAGGCGCCT	GGATCGATCC	GCGATGAAGA
	GCGGAGATCT	GCTCCGCGCA	CCTAGCTAGG	CGCTACTTCT
	AATTCGGCTG			
.....				
1951	AGTCAGCGTA	ATCTTCATCT	CTCTTAGATT	ATTTGTTTTC
	TCACTCGCAT	TAGAAGTAGA	GAGAACTCAA	TAAACAAAAG
	GTCATCATCC			
.....				
2001	GTCGTCAAGT	CCTTTTCAAT	CGTGTAAACA	AAATAAACTC
	CAGCAGTCCA	GGAAAAGTTA	GCACATTGGT	TTTATTGTAG
	GTCATCTTCC			
.....				
2051	ATATTGTGGG	GCAACAACAC	AATGGGCGTT	ACAGCAATAT
	TATAACACCC	CGTGTGTGTG	TTACCCGCAA	TGTCCTTATA
	ACGTCAATGG			
.....				
2101	TCGTGATCGA	TTCAAGAGGA	CATCATCTCT	TCTTTGGGTA
	AGCACTAGCT	AAGTTCICCT	GTAATAAGAA	AGAAACCCAT
	TAATAGGAAA			
.....				
2151	TCCAAAGAAC	ATTTTCCATC	CCACTTGGAG	TCATCCACAA
	AGGTTTCTTG	TAAAGGTAG	GGTGAACCTC	ACTAGGTGTT
	ATCGTGTAA			
.....				
2201	CAGGTAGTGC	ATGTGCACAA	ACTAGTTTGT	CGTGACAAAC
	GTCCAAATCAC	TACAGCTGTT	TGATCAAAACA	GCACTGTTTG
	ACAGTAGGTG			
.....				
2251	AAATCAATTG	AGATCAAGTG	GACTGAATCT	CGAAGGGAAT
	TTTACTTAAC	TCTAGTCAAC	CTGACTTAGA	GCTTCCCTTA
	CCTCACCCTT			
.....				
2301	CTGACGTGCC	ATCTGCAACT	AAAAGATGGG	GCTTCAGGTC
	GACTGCACGG	TAGACGTTGA	TTTTCTACCC	CGGTGTCCCA
	GCCACAGGGT			
.....				
2351	CCAAAGGTGG	TCAATTATGA	ACCTGGTGAA	TGGGCTGAAA
	GGTTTCCACC	AGTTAATACT	TCGACCCTT	ACCCGACTTT
	TGACGATGTT			
.....				
2401	TCTTGAATC	AAAAAACCTG	ACGGGAGTGA	GTGTCTACCA
	AGAATTTTAG	TTTTTTGGAC	TGCOCTCACT	CACAGATGCT
	CGTCGCGGTC			
.....				
2451	ACGGGATTCG	GGGCTTCCCC	CGGTGCCGGT	ATGTCCACAA
	TGCCCTAAGC	CCCGAAGGGG	GCCACGGCCA	TACACGTGTT
	TCATAGTCCT			
.....				
2501	ACGGGACCGT	GTGCCGAGGA	CTTTGCCCTT	CATTAAGAGG
	TGCCCTGGCA	CACGGCCTCT	GAAACGGGAG	GTATTTCTCC
	CACGAAAGAA			
.....				

2551 CCTGTATGAT CGACTTGCTT CCACAGTTAT CTACCGAGGA ACGACTTTTC
GGACATACTA GCTGAACGAA GGTGTCAATA GATGGCTCCT TGCTGAAGC

2601 CTGAAGGTGT CGTTGCATT CTGATACTGC CCCAAGCTAA GAAGGACTTC
GACTTCCACA GCAACGTAAA GACTATGACG GGGTTCGATT CTTCCTGAAG

2651 TTCAGCTCAC ACCCCTTGAG AGAGCCGGTC AATGCAACGG AGGACCCGTC
AAGTCGAGTG TGGGGAAGTC TCTCGGCCAG TTACGTTGCC TCCTCGGCAG

EcoRV

2701 TACTGGCTAC TATTCTACCA CAATTAGATA TCAGGCTACC GGTTTTGCAA
ATCACCAGTG ATACATGGT GTTATCTAT AGTCCGATCG CCAAAACCTT

2751 CCAATGAGAC AGAGTACTTG TTCGAGGTTG ACAATTTGAC CTACGTCCAA
GGTACTCTG TCTCATGAAC AAGCTCCAAC TGTAAACTG GATCCAGGTT

2801 CTGAATCAA GATTCACACC ACAGTTTCTG CTCCAGCTGA ATGAGACAAT
GAAGTTAGTT CTAAGTGTGG TGTCAAAGAC GAGGTCGACT TACTCTGTTA

2851 ATATACAAGT GGGAAAAGCA GCAATACCAC GGGAAAATA ATTTGGAAGG
TATATGTTCA CCTTTTCCG CGTTATGGTG CCTTTTGAT TAAACCTTCC

2901 TCAACCCCGA AATTGATACA ACAATCGGGG AGTGGGCTT CTGGGAAACT
AGTTGGGGCT TTAAGTATGT TGTAGCCCC TCACCCGGAA GACCCTTTGA

2951 AAAAAAACC TCACTAGAAA AATTCCGAGT GAAGAGTGT CTTCACAGT
TTTTTTTGG AGTGATCTTT TTAAGCGTCA CTTCTCAACA GAAAGTGTCA

3001 TGTATCAAAC GGAGCCAAA ACAATCAGTG TCAGAGTCCG GCGCGAACTT
ACATAGTTG CCTCGGTTTT TGTAGTCACC AGTCTCAGGC CCGGCTTGAA

3051 CTCCCGACCC ACGGACCAAC ACAACAATG AACACCACAA AATCATGGCT
GAAGGCTGGC TCCCTGGTTG TGTGTGAC TTCTGGTGT TTAGTACCGA

3101 TCAGAAATT CCTCTGCAAT GGTCAAGTG CACAGTCAAG GAAGGGAAGC
AGTCTTTTAA GGAGACGTTA CCAAGTTCAC GTGTCAGTTC CTTCCCTTCG

3151 TCGAGTGTGG CATCTAACAA CCCTTGCCAC AATCTCCAGG AGTCCCAAT
ACGTACACAG GTAGATTGTT GGGAACGGTG TTAGAGGTGC TCAGGGGTTA

3201 CCCTCACAAC CAAACCAGGT CCGGACAACA GCACCCATA TACACCCGTG
GGGAGTGTG GTTTGGTCCA GGCCTGTTGT CGTGGGTATT ATGTGGGCAC

3251 TATAAACTTG ACATCTCTGA GCGAACTCAA GTTGAACAAC ATCACCAGC
ATATTGAAC TGTAGAGACT CCGTTCAGTT CAACTTGTTG TAGTGGCGTC

3301 AACAGACAC GACAGCACAG CCTCCGACAC TCCCTCTGCC ACGACCCGAG
TTGTCTGTG CTCTCGTGC GGAGGCTGTG AGGAGACGG TCTGGCGTC

3351 CCGGACCCCC AAAAGCAGAG AACACCAACA CGAGCAAGAG CACTGACTTC
GGCCTGGGGG TTTTCGTCTC TTCTGTTGT CCTCGTTCTC GTGACTGAAG

3401 CTGGACCCCG CCACCACAAC AAGTCCCAA AACCAAGCG AGACCGGTGG
GACCTGGGCG GGTGGTGTG TTCAGGGGTT TTGGTGTGCG TCTGGCGACC

3451 CAACAACAC ACTCATCACC AAGATACCGG AGAAGAGAGT GCCAGCAGCG
GTGTTGTG TGACTAGTGG TTCTATGGCC TCTTCTCTCA CGGTCTGTGC

3501 GGAAGCTAGG CTTAATTACC AATACTATTG CTGGAGTCCG ACGACTGATC
CCTTCGATCC GAATTAATGG TTATGATAAC GACCTCAGCG TCCTGACTAG

3551 ACAGGCGGGA GAAGAAGTCG AAGAGAAGCA ATTGTCAATG CTCACCCCAA
TGTCGCCCTT CTCTTGAGC TCTCTTCGT TAACAGTTAC GAGTTGGGTT

3601 ATGCAACCCCT AATTTACATT ACTGGACTAC TCAGGATGAA GGTGCTGCAA
TACGTTGGGA TTAAATGTAA TGACCTGATG AGTCTACTT CCACGACGTT

3651 TCGGACTGGC CTGGATACCA TATTTCGGGC CAGCAGCCGA GCGAATTAC
AGCCTGACCG GACCTATGTT ATAAAGCCCG GTCCTGGCT CCCTTAAATC

3701 ATAGAGCGCC TAATGCACAA TCAAGATGGT TTAATCTGTG GOTTGAGACA
TATCTCCCG ATTACGTGTT AGTTCTACCA AATTAGACAC CCAACTCTGT

3751 GCTGGCCAC GAGACGACTC AAGCTCTTCA ACTGTTCTTG AGAGCCACAA
CGACCGGTTG CTCTGCTGAG TCGAGAAGT TGACAAGGAC TCTCGGTGTT

3801 CTGAGCTAGC CACCTTTTCA ATCCTCAACC GTAAGGCAAT TGATTCTTG
GACTCGATGC GTGGAAGT TAGGAGTTGG CATTCGGTTA ACTAAAGAAC

3851 CTGCAGCAT GGGCGGGCAC ATGOCACATT CTGGGACCG ACTGCTGTAT
GACGTGCTA CCGCGCGTG TACGCTGTA GACCTGGCC TGACGACATA

3901 CGAACCACAT GATTGCACCA AGAACATAAC AGACAAAT GATCAGATTA
GCTTGTGTA CTAACTGGT TCTGTATTG TCTGTTTAA CTAGTCTAAT

3951 TTCACTGATT TCTTGATAAA ACCCTTCCGG ACCAGCGGGA CAATGACAT
AAGTACTAA ACAACTATT TGGGAAGGCC TGCTCCCTT GTTACTGTTA

4001 TGGTCGACAG CATGGAGACA ATGGATACCG GCAGGTATTG GAGTTACAGG
ACCACCTGTC CTACCTCTGT TACCTATGGC CGTCCATAAC CTCATGTCC

4051 CGTTATAATT GCAGTTATCG CTTTATTCTG TATATGAAA TTTGTCTTTT
GCAATATTAA CGTCAATAGC GAAATAAGAC ATATAGTTT AAACAGAAA

4101 AGTTTTCCTT CAGATTGCTT CATGGAAGG CTCAGCCTCA AATCAATCAA
TCAAAACAA GTCTAACGAA CTACCTTTTC GAGTCGGAGT TTAGTTACTT

4151 ACCAGGATTT AATTATATGG ATTACTTGAA TCTAAGATTA CTTGACAAAT
TGGTCTTAA TTAATATACC TAATGAAGTT AGATTCTAAT GAAGCTTTA

4201 GATAATATAA TACACTGGAG CTTTAAACAT AGCCAATGTG ATTCTAACTC
CTATTATATT ATGTGACCTC GAAATTGTA TCGGTTACAC TAAGATTGAG

4251 CTTTAACTC ACAGTTAATC ATAAACAAGG TTTGGTACCG AGCTCGAATT
GAAATTTGAG TGTCAATTAG TATTGTCC AAACCATGGC TCGAGCTTAA

4301 ATCTGCTGTG CCTTCTAGTT GCCAGCCATC TGTGTGTGC CCTCCCGG
TAGACGACAC GGAAGATCAA CGGTGGTAG ACAACAAAC GGGAGGGGGC

4351 TGCTTCTCTT GACCTGGA GGTCCCACTC CCACTGTCTT TTCCTAATAA
ACGGAGGAA CTGGACCTT CCACGGTGAG GGTGACAGCA AAGGATTATT

4401 AATCAGGAAA TTGCATCGCA TTGTCTGAGT AGGTGTCATT CTATTCTGGG
TACTCTCTTT AACGTAGCGT AACAGACTCA TCCACAGTAA GATAAGACCC

4451 GGGTGGGGTG GGGCAGCACA GCAAGGGGGA GGATTGGGAA GACAATACCA
CCCACCCAC CCCGTCTGT GTTCCCGCT CCTAACCTT CTGTTATCGT

SphI

4501 GGCATGCTGG GGATCGGGTG GGCTCTATGG GTACCCAGGT GCTGAAGAAT
CCGTACGACC CCTACGCCAC CCGAGATACC CATGGGTCCA CGACTTCTTA

4551 TGACCCGGTT CCTCTGGGG CAGAAACAAG CAGGCACATC CCCTTCTCTG
ACTCGGCCAA CGAGGACCCG GTCTTCTTC GTCCGTGTAG GCGAAGAGAC

4601 TGACACACCC TGTCCAGGCC CCTGGTCTTT AGTCCAGCC CCACTCATAG
ACTGTGTGGG ACAGGTCCGG GGACCAAGAA TCAAGGTCCG GGTGAGTATC

4651 GACACTCATA GCTCAGGAGG GCTCCCGCTT CAATCCACCC CGCTAAAGTA
CTGTGAGTAT CGAGTCTTCC CGAGCCGGA GTTAGGTGG CCGATTTCAT

4701 CTGGGAGCGG TCTCTCCCTC CCTCATCAGC CCACCAACC AAACCTAGCC
GAACCTCGCC AGAGAGGGAG CGAGTAGTCC GGTGGTTTGG TTTGGATCGG

4751 TCCACGAGTG GGAAGAAATT AAAGCAAGAT AGGCTATTAA GTGCACAGGG
AGGTTCTCAC CCTCTTTTAA TTCTGTTCTA TCCGATAATT CACGTCTCCC

4801 AGAGAAAATG CCTCCAACAT GTGAGGAAGT AATGAGACAA ATCATAGAAT
TCTCTTTTAC GGAGGTTGTA CACTCCTTCA TTAATCTCTT TAGTATCTTA

4851 TTCTTCGGCT TCCTCGCTCA CTGACTCGCT GCGCTCGGTC GTTCGGCTGC
AAGAGGCGA AGGAGCGAGT GACTGAGCGA CCGGAGCCAG CAAGCCGACG

4901 GCGCAGCGGT ATCAGCTCAC TCAAGGCGG TAATACGGTT ATCCACAGAA
CCGCTCGCCA TAGTCCAGTG AGTTCCGCC ATTATGCCAA TAGGTGTCTT

4951 TCAGGGGATA ACGCAGGAAA GAACATGTCA GCAAAACGCC AGCAAAAGGC
AGTCCCCTAT TCGCTCCTTT CTGTGACACT CGTTTTCGGG TCGTTTTCG

5001 CAGGAACCGT AAAAAGGCGG CGTTGCTGGC GTTTTTCAT AGGCTCCGCC
GTCTTGGCA TTTTTCGGC GCAACGACCG CAAAAAGGTA TCCGAGCGCG

5051 CCCCTGACGA GCATCACAAA AATCGACGCT CAAGTCAGAG GTGGCGAAAC
GGGACTGCT CGTAGTGTTT TTAGCTCGGA GTTCAGTCTC CACCGCTTTC

5101 CCGACAGGAC TATAAAGATA CCAGGCGTTT CCCCCTGGAA GCTCCCTCGT
GGCTGTCTC ATATTCTAT GGTCCGCAA GCGGACCTT CGAGGGAGCA

5151 GCGCTCTCCT GTTCCGACCC TGCCGTTTAC CGGATACCTG TCCGCTTTC
CGCGAGAGGA CAAGGCTGGC ACGGCGAATG GCCTATGGAC AGCGGAAAG

5201 TCCCTTCGGG AAGCGTGGG CTTTCTCAAT GCTCAGCTG TAGGTATCTC
AGCGAAGCCC TTCCGACCCG GAAAGAGTTA CGAGTCCGAC ATCCATAGAG

5251 AGTTCGGTGT AGGTCTGTCG CTCCAAGCTG GCTGTGTGC ACGAACCOC
TCAAGCCACA TCCAGCAAGC GAGGTTCCGAC CCGACACAG TGCTTGGGG

5301 CATTACAGCC GACCGCTGCG CCTTATCCGG TAACTATCGT CTTGAGTCCA
 GCAAGTCGGG CTGGCGACGC GGAATAGGCC ATTGATAGCA GAATCAGGT

 5351 ACCCGGTAAAG ACAGGACTTA TCGCCACTGC CAGCAGCCAC TGGTAACAGG
 TCGGCCATTC TGTGCTGAAT ACCGGTGACC GTCGTCCGTG ACCATTGTCC

 5401 ATTAGCAGAG CGAGGTATGT AGCCGCTGCT ACAGAGTTCT TGAAGTGGTG
 TAATCGTCTC GCTCCATACA TCGCCACGA TGTCTCAAGA ACTTCACCAC

 5451 CCCTAACTAC GGCTACACTA CAAGGACAGT ATTTGGTATC TGGCCTCTGC
 CGGATTGATG CCGATGTGAT CTTCCTGTCA TAAACCATAG ACCCGAGACG

 5501 TGAAGCCAGT TACCTTCGGA AAAAGAGTTG GTAGCTCTTG ATCCGGCAAA
 ACTTCGGTCA ATGGAAGCCT TTTTCTCAAC CATCGAGAAC TAGGCCGTTT

 5551 CAATCCACCG CTGGTAGCGG TGGTTTTTTT GTTTCGAAGC AGCAGATTAC
 GTTTGGTGGC GACCATCGCC ACCAAAAA CAACGTTCC TCGTCTAATG

 5601 CCGCAGAAAA AAAGGATCTC AAGAAGATCC TTTCATCTTT TCTACGGGGT
 CCGCTCTTTT TTCTCTAGAG TTCTCTAGG AACTAGAAA AGATGCCCCA

 5651 CTGACGCTCA GTGGAACGAA AACTCAGGTT AAGGGATTTT GGTCAAGAGA
 GACTGCGAGT CACCTTGCTT TTGAGTGCAA TTCCCTAAAA CCAGTACTCT

 5701 TTATCAAAA GGATCTTCAC CTAGATCCTT TTAATTAATA AATGAAGTTT
 AATAGTTTTT CCTAGAGTG GATCTAGGAA AATTAAATTT TTACTTCAAA

 5751 TAAATCAATC TAAAGTATAT ATGAGTAAAC TTGGTCTGAC AGTTACCAAT
 ATTTAGTTAG ATTTCAATA TACTCATTTG AACCAGACTG TCAATGGTTA

 5801 GCTTAATCAG TGAGGCACCT ATCTCAGCGA TCTGTCTATT TCGTTCATCC
 CGAATTAGTC ACTCCGTGGA TAGAGTCGCT ACACAGATAA AGCAAGTAGG

 5851 ATAGTTGCTT CACTCCGCGG GGGGGGGGCG CTGAGGTCTG CCTCGTGAAG
 TATCAACGGA CTGAGGCCCC CCCCCCCCCG GACTCCAGAC GGAGCACTTC

 5901 AAGGTGTTGC TGAATCATAC CAGGCCTGAA TCGCCCATC ATCCAGCCAG
 TTCCACAACG ACTGAGTATG GTCCGGACTT AGCGGGCTAG TAGCTCGGTC

 5951 AAGTGAGGG AGCCACGGTT GATGAGAGCT TTGTTGTAGG TGCACCAATT
 TTCACTCCC TCGGTGCCAA CTAATCTCGA AACAACATCC ACCTGGTCAA

 6001 GGTGATTTTG AACTTTTGCT TTGCCACGGA ACGGTCTCGG TTGTCCGGA
 CCACTAAAAC TTGAAAACGA AACGGTGCTT TGCCAGACGC AACAGCCCTT

 6051 GATGCGTGAT CTGATCCTTC AACTCAGCAA AAGTTCGATT TATTCAACAA
 CTACGCACTA GACTAGGAAG TTGAGTCCTT TTCAAGCTAA ATAAGTTGTT

 6101 AGCCGCGGTC CCGTCAAGTC AGCGTAATGC TCTGCCAGTG TTACAACCA
 TCGCCGCGAG GCGAGTTCAG TCGCATIACG AGACGGTCAC AATGTTGCTT

 6151 TTAACCAATT CTGATTAGAA AAATCATCG AGCATCAAT GAACTGCAA
 AATTGGTTAA GACTAATCTT TTTGAGTAGC TGTAGTTTA CTTGACGTT

 6201 TTTATTGATA TCAGGATTAT CAATACCATA TTTTGAATA AGCCGTTTCT
 AAAAAGTAT AGTCTAATA GTTATGGTAT AAAAATTTT TCGGCAAGA

6251 GTAATGAAGG AGAAACTCA CCGAGGCACT TCCATAGGAT GCCAAGATCC
CACTACTTCC TCTTTTGAGT GGCTCCGTCA AGGTATCCTA CCGTTC TAGG

6301 TGGTATCGGT CTGCGATTCC GACTCGTCCA ACATCAATAC AACCTATTAA
ACCATAGCCA GACGCTAAGG CTGACCAGGT TGTAGTTATG TTGGATAATT

6351 TTTCCCTCCG TCAAAAATAA GGTATCAAG TGAGAAATCA CCATGAGTGA
AAAGGGGAGC AGTTTTTATT CCAATAGTTC ACTCTTAGT GGTACTCACT

HindIII

6401 CGACTGAATC CGGTGACAAT GGCAAAAGCT TATGCATTTC TTTCCAGACT
GCTCACTTAG GCCACTCTTA CCGTTTTCGA ATACGTAAAG AAAGGTCTGA

6451 TGTTCACACG GCCAGCCATT ACGCTCGTCA TCAAAATCAC TCGCATCAAC
ACAAGTTGTC CGGTCGGTAA TCGGAGCACT AGTTTAGTG AGCGTAGTTG

PvuI

6501 CAAACCGCTA TTCATTCTGT ATTCGCCCTG AGCGACACGA AATACGCGAT
GTTTGCAAT AAGTAAGCAC TAACCCGAC TCGCTCTGCT TTATGCGCTA

PvuI

6551 CGCTGTATAA AGGACAATTA CAAACAGGAA TCGAATGCAA CCGGCGCAGG
CCGACAATTT TCCTGTAAAT GTTTGTCTT AGCTTAGCTT GCGCGCTCC

6601 AACACTGCCA GCGCATCAAC AATATTTTCA CCTGAATCAG GATACTCTTC
TTGTACGGT CCGGTAGTTG TTATAAAGT GGAATTAGTC CTATAAGAAG

6651 TAATACCTGG AATGCTGTT TCCCGGGGAT CGCAGTGGTG AGTAACCATG
ATTATGGACC TTACGACAAA AGGGCCCCCTA GCGTCACCAC TCATTGGTAC

6701 CATCATCAGG AGTACGGATA AAATGCTTGA TCGTCGGAAG AGGCATAAAT
GTAGTAGTCC TCATGCCAT TTTACGAAT ACCAGCCTTC TCCGTATTTA

6751 TCCGTCAGCC AGTTTAGTCT GACCATCTCA TCTGTAACAT CATTTGGCAAC
AGGCAGTCCG TCAAAATCAGA CTGGTAGAGT AGACATTGTA GTAACCGTTG

6801 CCTACCTTTG CCATGTTTCA GAAACAACCC TGGCGCATCG GGCTTCCCAT
CGATGGAAAC GGTACAAAGT CTTTGTGAG ACCGCGTAGC CCGAAGGCTA

6851 ACAATCGATA GATTCTCGCA CCTGATTGCC CGACATTATC CCGAGCCCAT
TGTTAGCTAT CTAACAGCGT GGAATAACGG GCTGTAATAG CGCTCGGCTA

XhoI

6901 TTATACCCAT ATAAATCAGC ATCCATGTTG GAATTTAATC CGGCGCTCCA
AATATGGGTA TATTTAGTCC TAGGTACAAC CTTAAATTAG CGCGGAGCT

XhoI

6951 GCAAGACGTT TCCCGTTCAA TATGGCTCAT AACACCCCTT GTATTACTGT
CGTTCTGCAA AGGGCAACTT ATACCGAGTA TTGTGGGCAA CATATGACA

7001 TTATGTAAGC AGACAGTTT ATTGTTCAAG ATGATAATTT TTTATCTTGT
AATACATTCG TCTGTCAAAA TAACAAGTAC TACTATATTA AAATAGAACA

DraIII

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7051 GCAATGTAAC ATCAGAGATT TTGAGACACA ACGTGGCTTT CCCCCCCCCC
      CGTEACATTG TAGTCTCTAA AACTCTGTGT TGCACCGAAA CCGGGGGGGG
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7101 CCATTATTGA AGCATTATC AGCGTTATTG TCTCATGAGC GGATACATAT
      GGTAACTAACT TCGTAAATAG TCCCAATAC AGAGTACTCC CCTATGTATA
.....
7151 TTGAATGTAT TTAGAAAAAT AAACAAATAG GGGTTCCGCG CACATTTCCT
      AACTTACATA AATCTTTTTA TTTGTTTATC CCCAAGGCGC GTGTAAAGGG
.....
7201 CGAAAAGTGC CACCTGACGT CTAAGAAACC ATTATTATCA TGACATTAAC
      GCTTTTCACG GTGGACTGCA GATTCTTTGG TAATAATAGT ACTGTAATTG
.....
7251 CTATAAAAT AGGCGTATCA CGACGCCCTT TCGTC
      GATATTTTA TCCGCATAGT GCTCCGGGAA ACCAG
.....

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09600766-051401

pVA 1012-SCP(2)

General Description

DNA pVR 1012-SCP(2)

Local object

Created: 09/14/98 04:29PM

Last Modified: 09/15/98 04:50PM

length: 7272 bp

storage type: Basic

form: Circular

Comments

Restriction Map

DraIII: 1 site CACNNGGTG
GTGNNACAC

HindIII: 1 site AAGCTT
TTCCGA

HpaI: 1 site GTTAAC
CAATTG

KpnI: 1 site GGTACC
CCATGG

NotI: 1 site GCGGCCGC
CGCCGGCG

PmlI: 1 site CACGTC
GTGCAC

PvuI: 1 site CGATCG
GCTAGC

SacII: 1 site CCGCGG
GGCGCC

XbaI: 1 site TCTAGA
AGATCT

XhoI: 1 site CTCGAG
GAGCTC

EcoRV: 2 sites GATATC
CTATAG

NcoI: 2 sites CCATGG
GGTACC

NdeI: 2 sites CATATG
GTATAC

SphI: 2 sites GCATCG
GCTACG

Functional Map

CDS (4 signals)

CMV IE 5' UT

Start: 886 End: 1129

CMV IE INT

Start: 1130 End: 1840

TbGH

Start: 4289 End: 4841

Kanr

Start: 6337 End: 6959 (Complementary)

Misc_feature (2 signals)

09600766-051401

CMV enhancer

Start: 248 End: 885

SGP(Z)

Start: 1870 End: 4288

Annotations

09600766.051401

1 TCGCGCGTTT CGGTGATGAC GGTGAAAACC TCTGACACAT GCAGCTCCCG
 ACGCGCGCAA GCGACTACTG CCAGTTTTCG AAGCTGTGTA CGTCGAGGGC

 31 GAGACGGTCA CAGCTTGTCT GTAAAGCGGAT CCGGGGACCA GACAAGCCCG
 CTCGCCAGT GTCGAACAGA CATTCGCCTA CCGCCCTCGT CTGTTGGGGC

 101 TCAGGCGCGG TCAGCGGGTG TTGGCGGGTG TCGGGGCTGG CTTAACTATG
 AGTCCCGCGC AGTCGCCCCAC AACCGCCAC ACCCCCGACC GAATTGATAC

NdeI

151 CGGCATCAGA GCAGATTGTA CTGAGAGTGC ACCATATGCG GTGTGAAATA
 GCGGTAGTCT CGTCTAACAT GACTCTCAGC TGGTATACGC CACACTTTAT

 201 CCGCACAGAT GCGTAAGGAG AAAATACCGC ATCAGATTGG CTATTGCCCA
 GCGGTGTCTA CGCATTCCCTC TTTTATGGCG TAGTCTAACG GATAACCGGT

 251 TTGCATACGT TGTATCCATA TCATAAZATG TACATTTATA TTGGCTCATG
 AACGTATGCA ACATAGGTAC ACTATTATAC ATGTAAATAT AACCGAGTAC

 301 TCCAACATTA CCGCCATGTT GACATTGATT ATTGACTAGT TATTAAATAGT
 AGGTTGTAAT GCGCGTACAA CTGTAACTAA TAACTGATCA ATAATTATCA

 351 AATCAATTAC GGGGTCATTA GTTCATAGCC CATATATGGA GTTCCGCGTT
 TTAGTTAATG CCCCAGTAAT CAAGTATCGG GTATATACCT CAAGCGGCAA

 401 ACATAACTTA CCGTAATGG CCGGCTGGC TGACCGCCCA ACGACCCCG
 TGTATTGAAT GCCATTTACC GCGCGGACCG ACTGGCGCGT TCGTGGGGGC

 451 CCCATTGACG TCAATAATGA CGTATGTTCC CATAGTAACG CCAATAGGGA
 GGGTAACTGC AGTTATTACT GCATACACG GTATCATTCG GGTATCCCT

 501 CTTTCCATTG ACGTCAATGG GTGGAGTATT TACGGTAAAC TGCCCACTG
 GAAAGGTAAC TGCAGTTACC CACCTCATAA ATGCCATTTC ACGGSGTGAAC

NdeI

551 GCAGTACATC AAGTGTATCA TATGCCAAGT ACGCCCCCTA TTGACGTCAA
 CGTCATGTAG TTCACATAGT ATACCGTTCA TCGGGGGGAT AACTGCAGTT

 601 TGACGGTAAA TGGCCCCGCT GGCATTATGC CCAGTACATG ACCTTATGGG
 ACTGCCATTT ACCGGGCGGA CCGTAATACG GGTCAATGAC TCGAATACCC

NcoI

651 ACTTCCCTAC TTGGCACTAC ATCTACGTAT TAGTCATCGC TATTACCATG
 TCAAGCATG AACCGTCATG TAGATGCATA ATCAGTAGCG ATAATGATAC

NcoI

701 GTGATCGCGT TTGGCAGTA CATCAATGGG CGTGGATAGC GGTTCGACTC
 CACTACGCCA AAACCGTCAT GTAGTTACCC GCACCTATCG CCAAACTGAG

 751 ACGGGGATTT CCAAGTCTCC ACCCCATTGA CGTCAATGGG AGTTTCTTTT
 TGGCCCTAAA GGTTCAGAGG TGGGTAACCT GCAGTACCC TCAACAAAA

 801 GGCACCAAAA TCAACGGGAC TTCCAAAAT GTCGTAAACA CTCGCCCCCA
 CCGTGGTTTT AGTTGCCCTG AAAGGTTTCA CAGCATGTTT GAGGCGGGGT

901 AGCTCGTTTA GTGAACCGTC AGATCGCCTG GAGACGCCAT CCACGCTGTT
TCGAGCAAT CACTTGGCAG TCTAGCGGAC CTCTGCGGTA GGTGCGCAA

951 TTAGCCTCCA TAGAAGACAC CGGGACCGAT CCAGCCTCCC CGGCCGGGAA
AAGTGGAGGT ATCTTCTGTG GCCCTGGCTA GGTGGGAGGC GCCGSCCTT

1001 CCGTGCAATG GAAAGCGGAT TCCCGTGCC AAGAGTGACC TAAGTACCGC
GCCACGTAAC CTTCCGCCCTA ACGGGCACGG TTCTCACTGC ATTCAATGGCG

1051 CTATAGACTC TATAGGCACA CCCCTTTGGC TCTTATGCAT GCTTACTGT
GATATCTGAG ATATCCGTGT GGGGAACCG AGAATACGTA CGATATGACA

1101 TTTTGGCTTG GGGCCTATAC ACCCCCGCTT CTTTATGCTA TAGGTGATGG
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1151 TATAGCTTAG CCTATAGGTG TGGGTATTG ACCATTATTG ACCACTCCCC
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1201 TATTGGTGAC GATACTTCC ATTACTAATC CATAACATGG CTCTTGGCA
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1251 CAACTATCTC TATTGGCTAT ATGCCAATAC TCTGTCTTC AGAGACTGAC
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1301 ACGGACTCTG TATTTTACA GGATGGGGTC CCATTTATTA TTACAAATT
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1351 CACATATACA ACAACGCCGT CCCCCGTGCC CGCAGTTTTT ATTAACATA
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1401 GCGTGGGATC TCCACGGCAA TCTCGGGTAC GTGTTCCGGA CATGGGCTCT
CGGACCGTAG AGGTGCGCTT AGAGCCCATC CACAAGCCCT GTACCCGAGA

1451 TCTCCGGTAG CGCCGGAGCT TCCACATCCG AGCCCTGGTC CCATGCGTCC
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1501 AGCGGCTCAT CGTCGCTCGG CAGCTCCTTG CTCCTAACAG TGGAGGCCAG
TCGCGAGTA CCAGCGAGCC GTCGAGGAAC GAGGATTGTC ACCTCCGGTC

1551 ACTTAGGCAC AGCACAATGC CCACCACCAC CAGTGTGCCG CACAAGGCGG
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1601 TCGCGGTAGG GTATGTGTCT GAAATGAGC GTGGAGATTG GGCTCGCAAG
ACGGCATCC CATAACAGA CTTTACTCG CACCTCTAAC CCGAGCGTGC

1651 GCTGACGCAC ATGGAAGACT TAAGGCAGCC GCAGAAGAAG ATCCAGGCAC
CGACTGCGTC TACCTTCCTGA ATTCCGTCGC CGTCTTCTTC TACGTCCGTC

2701 CTGAGTTGTT GTATTCTGAT AAGAGTCAGA GGTAACGCC GTTGCGGTCC
GACTCAACAA CATAAGCTA TTCTCAGTCT CCATTGAGGG CAACGCCACG

NpaI

1751 TGTAAACGGT GGAGGGCACT GTAGTCTGAG CAGTACTCGT TGCTGCCCGG
ACAATTGCCA CCTCCCGTCA CATCAGACTC GTCATGAGCA ACGACGGCGC

NcoI

1801 CGCCGCCCA GACATAATAG CTGACAGACT AACAGACTGT TCCTTTCCAT
CGCGCGTGGT CGGTATTATC GACTGTCTGA TTCTCTGACA AGGAAAGGTA

NcoIPstIEcoRVNotI

1851 GGGTCTTTTC TGCATCACC GTCCTCGACA CGTCTGATCA CATATCCCGG
CCCAGAAAG ACCTCAGTGG CAGCAGCTGT GCACACTAGT CTATAGCCGC

NotI XbaI

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GGCGAGTCT GGTCCGCGGA CCTAGCTTAA CTACTTCTAA TTCGGCTGTC

1951 TGAGCGTAAT CTTCACTCTT CTTAGATTAT TTGTTTCCA GAGTAGGGGT
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2001 CCGTCAAGTCC TTTCAATCG TGTAACAAA ATAACTCCA CTAGAAGGAT
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2051 ATTGTGGGSC AACACACAA TGGGCGTTAC AGGAATATTG CAGTTACCTC
TACACCCCG TTGTTGTGTT ACCCGCAATG TCCTTATAAC GTCAATGGAG

2101 GTGATCGATT CAGGAGGACA TCATTCTTTC TTTGGGTAAT TATCCTTTTC
CACTAGCTAA GTTCTCTGT AGTAAGAAAG AAACCCATTA ATAGGAAAG

2151 CAAAGACAT TTTCCATCCC ACTTGAGTC ATCCACAATA GCACATTACA
GTTTCTGTA AAAGGTAGGG TGAACCTCAG TAGGTGTTAT CGTGTAAATG

2201 GGTACTGAT CTGACAAAC TAGTTTGTCTG TGACAACTG TCATCCACAA
CCAATCACTA CAGCTGTTTG ATCAACAGC ACTGTTTGAC AGTAGGTGTT

2251 ATCAATTGAG ATCAGTTGGA CTGAATCTCG AAGGGAATGG ACTGGCAACT
TAGTTAACTC TAGTCAACCT GACTTAGAGC TTCCCTTACC TCACCGTTGA

2301 GACGTGCCAT CTGCAACTAA AAGATGGGGC TTCAGGTCCG GTGTCCACC
CTGCACGGTA GACGTTGATT TTCTACCCCG AAGTCCAGGC CACAGGGTGG

2351 AAAGGTGGTC AATTATGAAG CTGGTGAATG GGCTGAAAAC TCCTACAATC
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2401 TTGAAATCAA AAAACCTGAC GCGAGTGAGT GTCTACCAGC AGCCCCAGAC
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2451 CGGATCGGG GCTTCCCCCG GTGCCGTAT GTGCACAAAG TATCAGGAAC
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2501 GGCACCGTGT GCCGGAGACT TTGCTTTCCA TAAAGAGGGT GCTTTCTTCC
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2551 TGTATGATCG ACTTGCTTCC ACAGTTATCT ACCGAGGAAC CACTTTCGCT
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2601 CAAGGTGTCG TTGCATTCT GATACTGCC CAAGCTAAGA AGGACTTCTT
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2651 CAGCTCACAC CCTTGAAGAG AGCCGCTCAA TGCAACGGAG GACCCGTCTA
GTCCAGTGTG GGGAACTCTC TCGGCCAGTT ACGTTGCCTC CTGGGCAGAT

EcoRV

2701 GTGGCTACTA TTCTACCACA ATTAGATATC AGGCTACGGG TTTTGGAAAC
CACCAGTAT AAGATGGTGT TAATCTATAG TCCGATGGCC AAAACCTTGG

2751 AATGACACAG ACTACTTGTT CGAGGTTGAC AATTTCACCT ACGTCCAAC
TTACTCTGTC TCATGAACAA GCTCCAACG TTAAACTGCA TGCAGTTGA

2801 TGAATCAAGA TTCACACCAC AGTTTCTGCT CCAGCTGAAT GAGACAATAT
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2851 ATACAAGTGG GAAAGGAGC AATACCACGG GAAACTAAT TTGGAAGGTC
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2901 AACCCCGAAA TTGATACAAC AATCGGGGAG TGGGCCTTCT GGGAACTAA
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3001 ATCAAACGGA GCCAAAAACA TCAGTGTCTA GACTCCGGCG CGAACTTCTT
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3101 GAAATTCCT CTGCAATGGT TCAAGTGCAC AGTCAAGGAA GGGAGCTGC
CTTTTAAGGA GACGTTACCA AGTTCACGTG TCAGTTCCTT CCCTTCGAGC

3151 AGTGTCCCAI CTAACAACCC TTCCACAAT CTCCACGAGT CCCCATCCC
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3201 TCACAACCAA ACCAGGTCCG GACAACAGCA CCCATAATAC ACCCGTGTAT
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3251 AAAGTTGACA TCTCTGAGGC AACTCAAGTT GAACAACATC ACCGCAGAAC
TTTGAAGTGT AGAGACTCCG TTGAGTTCAA CTGTTGTAG TGGCGTCTTG

3301 AGACAACCAAC AGCAGAGCCT CCGACACTCC CTCTGCCAGC ACCCGAGCCG
TCTGTGCTG TCGTGTCCGA GCGTGTGAGG GAGACGGTGC TGGCGTCGGC

3351 GACCCCCAAA AGCAGAGAAC ACCAACAGCA GCAAGAGCAC TCACTTCTTG
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3401 GACCCCGCCA CCACAACAAG TCCCAAAAC CACAGCGAGA CCGCTGGCAA
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3451 CAACAACACT CATCAACCAAG ATACCGGAGA AGAGAAGGCC AGCAGCGGGA
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3501 AGCTAGGCTT AATTACCAAT ACTATTGCTG GAGTCGCAGG ACTGATCACA
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 3601 CAACCTTAAT TTACATTACT GGACTIONCA GGATGAACGT GCTGCAATCG
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 3701 GAGCGGCTAA TGCACAATCA AGATGGTTA ATCTGTGGGT TGAGACAGCT
 CTCGCCGATT ACGTGTAGT TCTACCAAT TAGACACCA ACTCTGTGCA

 3751 GCGCAACGAG ACGACTCAAG CTCTCAACT GTTCCTGAGA GCCACAACCTG
 CCGGTTCTCT TCCTGAGTTC GAGAAGTTGA CAAGGACTCT CCGTGTTCAC

 3801 ACCTACGAC CTTTCAATC CTCACCGTA AGGCAATTGA TTTCTGCTG
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 3851 CAGCGATGGG GCGGCACATG CCACATTCTG GGACCGGACT CCGTATCGA
 GTCCTACCC CCGCGGTAC GGTGAAGAC CCTGGCTGA CGACATAGCT

 3901 ACCACATGAT TCGACCAAGA ACATAACAGA CAAAATTGAT CAGATTATTC
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 3951 ATGATTTTGT TGATAAACC CTTCGGACC AGGGGACAA TGACAATTGG
 TACTAAACA ACTATTTTGG GAAGGCTCG TCCCGCGTT ACTGTAAACC

 4001 TGGACAGGAT CGAGACAATG GATACCGCA GGTATTGGAG TTACAGGCGT
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 ATATTACGT CAATAGCGAA ATAAGACATA TACGTTTAA CAGAAAATCA

 4101 TTTCTTCAG ATTGCTTCAT GGAAAAGCTC AGCCTCAAAT CAATGAAGCC
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 4151 AGGATTTAAT TATATGGATT ACTTGAATCT AAGATTACTT GACAAATGAT
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 4201 AATATAATAC ACTGGAGCTT TAAACATAGC CAATGTGATT CTAACCTCTT
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 4251 TAACTCACA GTTAATCATA AACAGGTTT GGAATTGATC TCCTGTGCTT
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 4301 TCTAGTTGCC AGCCATCTGT TGTTCGCC CCGCCCGTGC CTTCCTTGAC
 AGATCAACGG TCGGTAGACA ACAAAACGGG AGCGCGCACC GAAGGAAGTG

 4351 CCTGGAAGGT GCCACTCCA CTTCCCTTC CTAAATAAT GAGGAAATG
 CGACCTTCCA CCGTGAGGCT GACAGGAAG GATTATTTA CTCCTTTAAC

 4401 CATCGCAATG TCTGAGTAGG TGTATTCTA TTCTGGGCGG TCGCGTGGGG
 GTACCGTAAC AGACTCATCC ACAGTAAGAT AAGACCCCCC ACCCCACCCC

SphI

4451 CACCACAGCA AGGGCGAGGA TTGGGAAGAC AATAGCAGGC ATGCTGGGGA
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RpnI

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HindIII

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PvuI

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DraIII

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